THE RELATIONSHIP BETWEEN MARKETING STRATEGIES AND RISK SELECTION IN MEDICARE AT-RISK HMOs

by Richard L. Lichtenstein, Project Director and
Principal Investigator,
J. William Thomas, Bruce A. Watkins,
James M. Lepkowski, Christopher P. Puto,
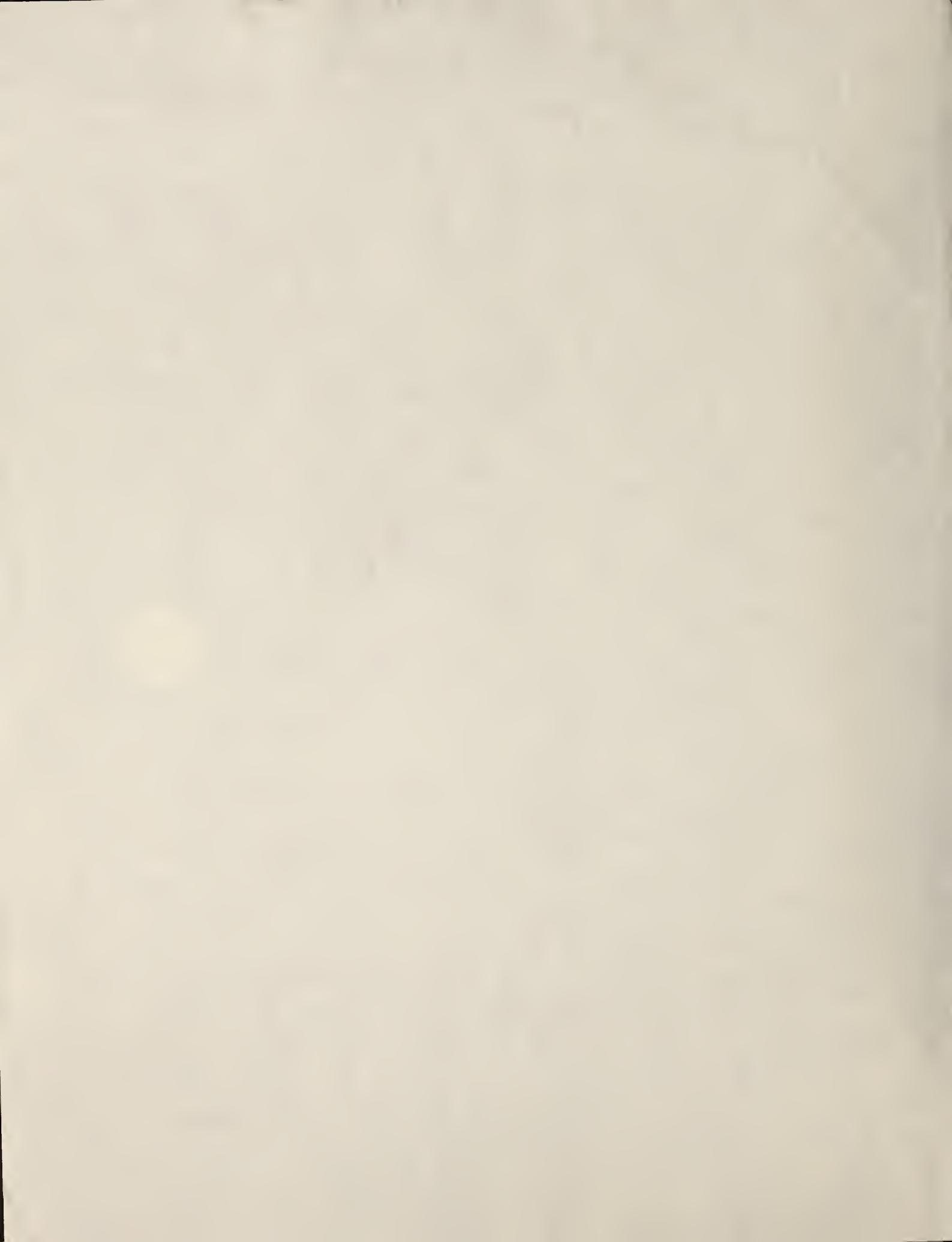Janet Adams-Watson, Bridget M. Simone,
and David Vest

Federal Project Officer: Ruth B. Pickard

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EXECUTIVE SUMMARY

This is the final report submitted to HCFA in accordance with Cooperative Agreement Number 17-C-99070/5-02. The purpose of the project was to determine whether risk selection experienced by HMOs with Medicare At-Risk (TEFRA) contracts was related to the organizational structure and marketing activities of and these HMOs.

The study design involved the following steps: 1) Selection of a sample of TEFRA HMOs; 2) For each HMO, the selection of a sample of new enrollees and a comparison group of non-enrollees; 3) A survey of enrollees and non-enrollees to test for differences in health status and other individual characteristics; 4) Classification of each HMO in terms of its risk selection -- favorable, neutral or adverse; 5) A detailed analysis of the marketing activities of each HMO during the study period; and 6) An analysis of specific marketing decisions and their relationships with risk selection.

A non-random sample of 22 HMOs with Medicare At-Risk contracts in 12 cities was selected. Only those HMOs which were actively marketing TEFRA programs and anticipated enrolling at least 300 new members during a specified 3-month period of the Summer of 1988 were included. Twenty of the selected HMOs fully cooperated with the study and provided needed data; two HMOs refused to cooperate but were included to test whether they differed from the cooperating HMOs.

Samples of new HMO enrollees were randomly selected from lists provided either by the HMO or by HCFA. Comparison groups of non-enrollees were randomly selected from lists (the UHHIMRS file) of all Medicare beneficiaries living in the HMO service area. A total of 10,035 beneficiaries were surveyed by mail. An overall response rate of 71% was obtained and a small telephone survey of non-respondents indicated that there was no non-response bias in the data that were collected. The survey instrument included questions on the respondents' functional health status and demographic characteristics as well as questions concerning the importance or salience to the individual of twelve major health plan characteristics.

To obtain detailed and comprehensive data on HMO marketing activities, a multi-faceted data collection strategy was employed. From the data that were collected, a large number of variables related to the "four Ps" of marketing: product, price, place and promotion, were developed. A detailed analysis of each HMO's process of enrollment was also performed. Another major component of the study involved a content analysis of all advertising and promotional material.

The health status of HMO enrollees and non-enrollees was compared in several ways to determine selection bias. Over all, nine HMO plans were found to have experienced favorable selection; fourteen had neutral selection, and none experienced adverse selection.

Using weighted least squares regression, numerous organizational, marketing and advertising variables were tested as predictors of degree of selection bias. Given the small number of HMO cases and the large number of predictor variables, complex multivariate models could not be created. However, since it was found that the best single predictor of

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selection bias was the number of years in risk-contracting with Medicare (the more years an HMO had been risk-contracting with Medicare, the more likely it was to have neutral rather than favorable selection), this variable was used as a control variable in all subsequent models.

Our analyses indicated that, controlling for "years at-risk", the following variables were significantly related to favorable selection:

* Being a pure Staff or Group model HMO;
* Charging a higher monthly premium in comparison to the price of a popular local Medigap policy;
* Employing a marketing strategy that includes a heavier use of television;
* Requiring a copayment for primary care office visits;
* Requiring a copayment for some or all inpatient care.

After controlling for "years at-risk", the following variables were significantly related to neutral selection (i.e.: enrolling beneficiaries who were somewhat more disabled):

* Being affiliated with a prestigious medical group;
* Employing a marketing strategy that includes a higher number of community meetings.

Perhaps what is more revealing are some of the variables which were found not to be significantly related to selection bias:

* Offering a Prescription Drug Benefit;
* Being an Individual Practice Association;
* Placing or not placing participating physicians at-risk;
* Using the following promotional approaches: direct mail, telemarketing, newspaper campaign;
* Having a higher overall advertising budget;
* HMO size (overall and TEFRA enrollment);
* Market area TEFRA penetration rate;
* The number of delivery sites available to HMO enrollees;
* HMO profit status or chain membership;
* Being affiliated with a prestigious hospital.

In terms of the content analyses of advertising and promotional material, the following significant results were obtained:

* Advertisements from HMOs with favorable selection contained less information than those from HMOs with neutral selection;
* Radio and television ads from HMOs which experienced favorable selection had a quicker pace, were more cluttered and were more confusing than those from HMOs which experienced neutral selection.

Content elements which were not found to be significantly related to selection bias include:

* The themes stressed in the advertisements (e.g.: choice of provider, low cost, health maintenance, types of services covered, minimal paperwork);
* The implied health status of models used in advertisements.

The results of the analyses relating marketing to selection bias indicate that few of the hypothesized relationships were confirmed. In part, this may be due to the limited variation in the dependent variables, since no instances of adverse selection were found. Combined with the limited number of cases studied, this lack of variation restricted the power of statistical tests used to explore these relationships.

Based upon our statistical findings and our observations during data collection, we found no indication that TEFRA HMOs are systematically engaging in deliberate skimming, i.e. in attempts to enroll only healthy beneficiaries or to prevent or discourage sicker beneficiaries from enrolling. Alternatively, if HMO executives were using existing knowledge to pursue a strategy of skimming, it didn't work. The rationale for these conclusions is as follows:

1) Few of our hypotheses were confirmed. If skimming was occuring, we would have expected certain marketing elements such as benefits provided, themes stressed in promotional material, and the enrollment process to be instrumental in that strategy. However, none of our hypotheses concerning these elements was confirmed.

2) Some marketing elements, namely the media used in promotions and certain pricing characteristics, were found to be related to selection bias in a direction opposite to what one would have anticipated under a skimming strategy. Thus, if an HMO was trying to direct its message only to the healthy, one would think it could do so by carefully selecting the sites of its community meetings and by avoiding a mass medium such as television. Our results indicate, however, that higher use of TV campaigns is related to favorable selection and use of community meetings is related to neutral selection. All other promotional strategies had no relationship to selection bias.

Likewise, premium price level, although related to favorable selection, was related in the "wrong" direction. That is, previous literature (for the under 65 population) indicates that the higher the premium, the more likely adverse selection is to occur. We, therefore, would have expected lower premiums to be related to favorable selection. Our findings show, however, that the higher the premium the more likely favorable selection was to occur in these TEFRA HMOs.

3) Some of the most significant variables we identified, i.e. HMO maturity (number of years in the at-risk Medicare business) and being a staff or group model HMO, are not manipulable in the short run. Furthermore, the relationship between maturity and selection bias is another instance of a relationship being in the "wrong direction" to support an hypothesis of intentional skimming. That is, one would assume that if HMOs were trying to skim, more experienced HMOs would be better at it. What we found was that more mature risk contractors enrolled sicker beneficiaries than did newer entrants to the Program.

Of the marketing variables investigated, the only one having a significant relationship to favorable selection in the predicted direction was a price variable, copayment for primary care visits or inpatient care. Even in this case, however, our observations suggest that many HMOs established these copayment requirements to reduce monthly premiums or decrease utilization, not to discourage sicker people from joining.

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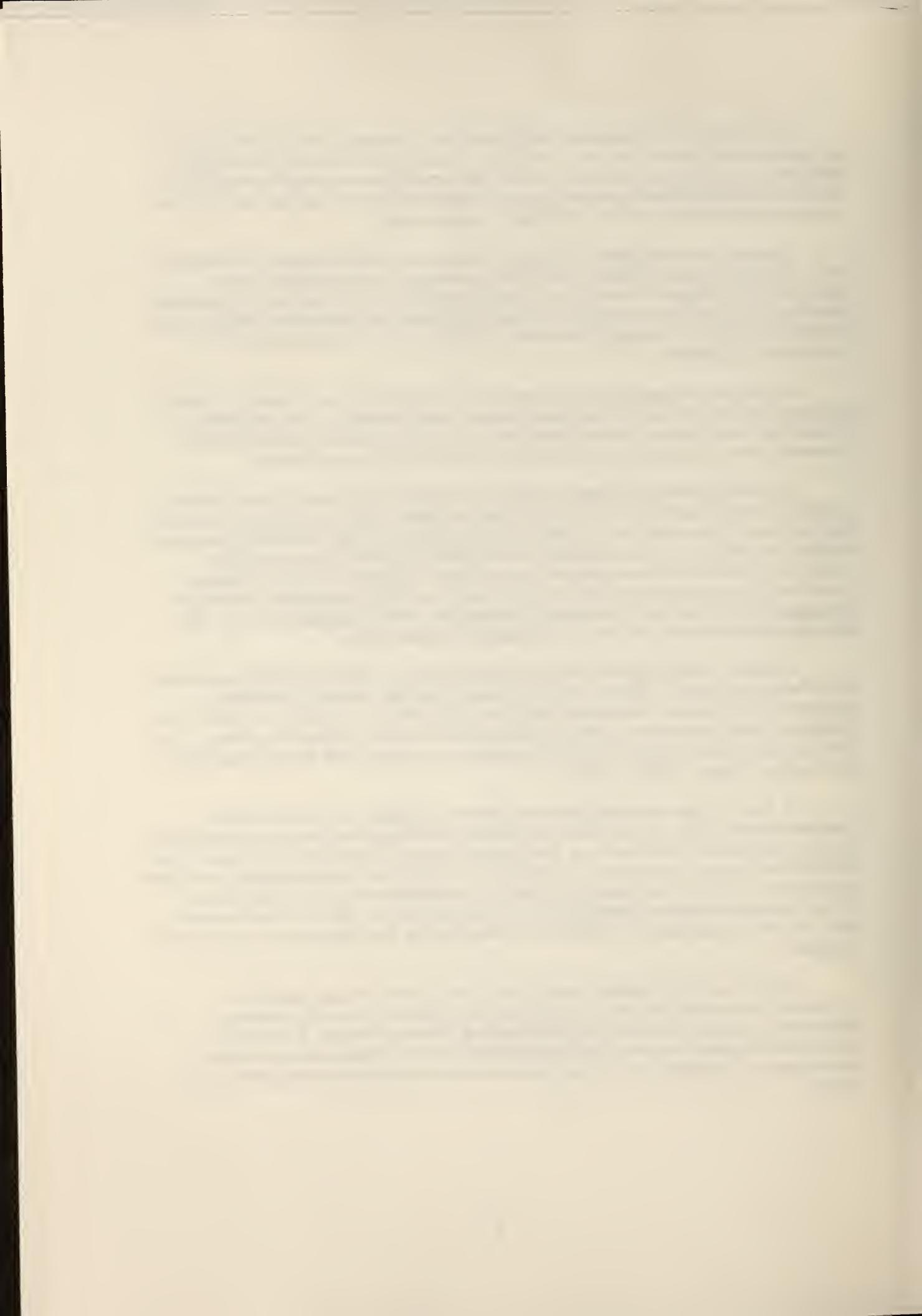
4) Our content analysis of HMO advertisements revealed that print ads which present less information and TV or radio ads which were more difficult to follow were more likely to be from HMOs experiencing favorable selection. While this was consistent with our hypotheses, we do not believe that these ad formats were chosen deliberately to influence selection -- neither HMO marketing staff nor advertising agency representatives were cognizant of potential relationships between ad format and selection bias.

One reason for undertaking this study was to provide HCFA with information concerning the need for specific regulations for controlling marketing practices of TEFRA HMOs. While our findings confirm previous evidence that Medicare HMOs are experiencing neutral or favorable selection, they also suggest that the observed selection patterns are not the result of deliberate marketing actions of the HMOs. On the contrary, it appears that observed patterns tend to reflect patient self-selection. The most significant differences observed between Medicare beneficiaries who enrolled in HMOs and those who chose to remain in the fee-for-service system were in their attitudes toward specific health plan attributes. For example, those who chose to remain in fee-for-service were found to value freedom of choice in their selection of physicians and hospitals much more highly than did those who enrolled in HMOs. Reviewing the findings of this study, we conclude that major changes to existing regulations governing HMO marketing practices are not justified, and that additional regulations in this area are unlikely to reduce the favorable selection experienced by some TEFRA HMOs.
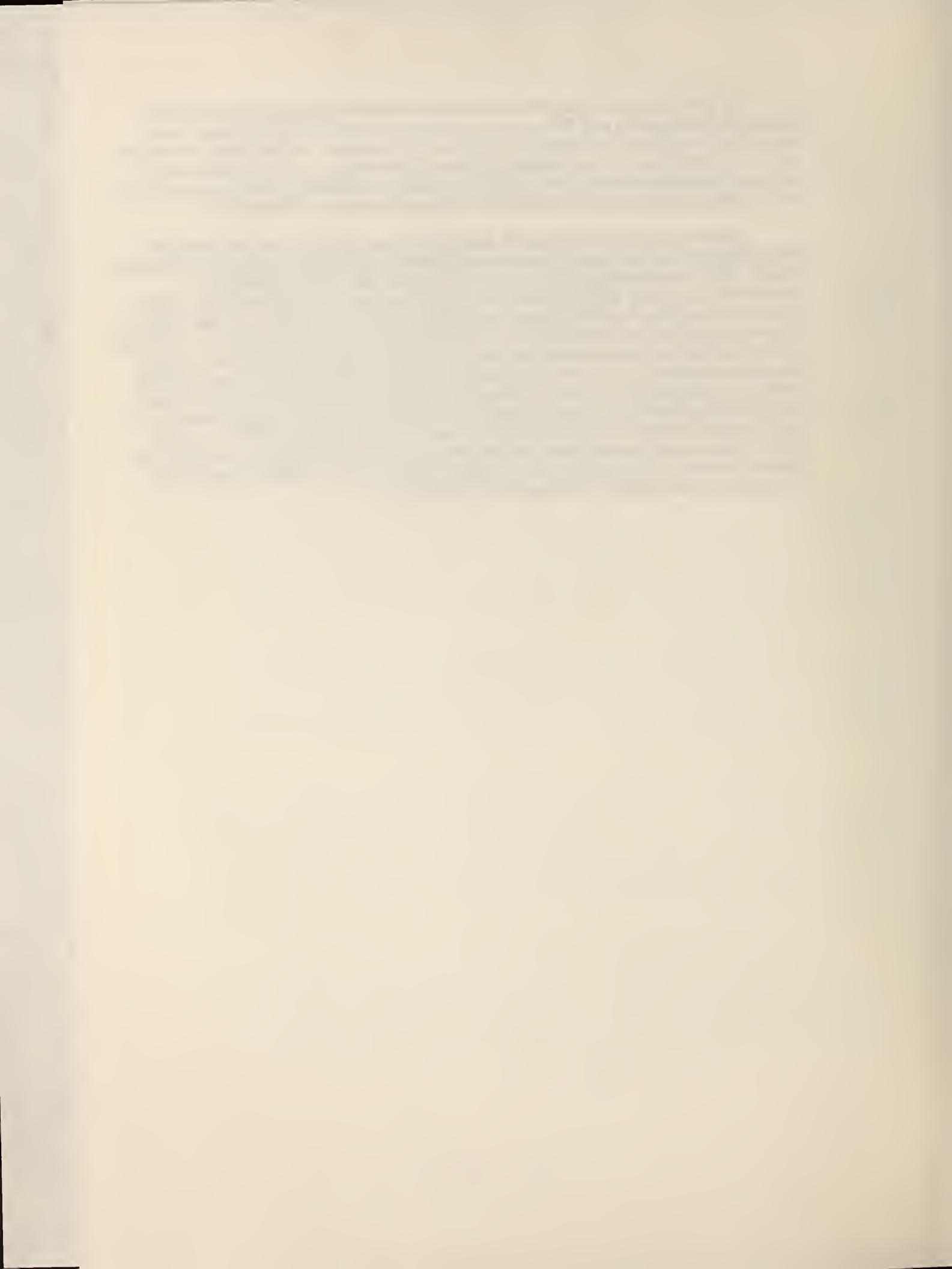
1.0. INTRODUCTION

The development of Medicare programs to encourage HMOs to serve the elderly has been a concern of policy makers for many years. There is general agreement that increased enrollment of Medicare beneficiaries in HMOs may be a way to temper the rate of inflation in Medicare program costs while maintaining benefits (Thomas et al., 1983; Lubitz, Beebe, and Riley, 1985). It is also believed that features of the HMO delivery system are well suited to the needs of an elderly population (Bonanno and Wetle, 1984) and can lead to improved quality of care for the elderly (Iversen, Polich, and Oberg, 1987). These features include the more comprehensive nature of benefits usually offered by HMOs with risk contracts (such as routine primary care), better coordination of care, and the substitution of earlier, less expensive ambulatory care for later, more expensive inpatient care.

Although limited options existed for HMOs to enroll Medicare beneficiaries prior to the passage of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), only 64 HMOs had signed contracts with the Medicare program as of December 1979, and only one of these contracts was on a risk basis (Langwell and Hadley, 1986a). It was not until the TEFRA regulations were published in 1985 that significant numbers of HMOs and CMPs (Competitive Medical Plans) became involved in contracting with Medicare on a risk basis. (For simplicity, this report will refer to all HMOs and CMPs as "HMOs.") However, early estimates of the degree to which HMOs would participate in this program, and the extent to which Medicare beneficiaries would embrace the concept of HMO membership, were overly optimistic (Pitt, 1988). HCFA estimated in 1986 that 21 million Medicare beneficiaries would enroll in risk contracts by 1990 (Ernst & Whinney, 1986). (This compares to the 1,075,499 Medicare beneficiaries who are actually enrolled as of June 1, 1989.) As detailed below, there are also concerns that even with significant risk enrollment by Medicare beneficiaries in HMOs, the TEFRA risk program may not serve as a means to control costs for the Medicare program overall.

One major concern has been the appropriateness of the method by which payments to HMOs are calculated. HMOs receive a monthly capitation payment based on a formula called the Adjusted Average Per Capita Cost (AAPCC). Using as its base an estimate of the national average cost to the Medicare program for each Medicare beneficiary (the United States Per Capita Cost, or USPCC), the AAPCC is calculated by applying a geographic adjustment factor and individual adjustment factors for age, sex, welfare status and institutional status. An HMO that enrolls Medicare beneficiaries on a risk basis receives 95% of the AAPCC.

Criticism of the AAPCC methodology relates to the baseline data used to create the adjustment variables (Trieger, et al., 1982; Greenlick, 1985), and to the poor ability of the AAPCC model to predict future costs (Thomas and Lichtenstein, 1986; Anderson et al., 1982; Beebe, Lubitz, and Eggers, 1985). These studies tested alternative payment models which included measures of health status (such as prior utilization or beneficiaries' self-reported functional health status) and found that including additional factors improved the predictive power of the payment formula.

A second concern is the issue of risk selection. If the Medicare beneficiaries who enroll in risk HMOs are systematically different from beneficiaries who do not choose to enroll, and if this systematic difference is related to the cost of providing health care to the
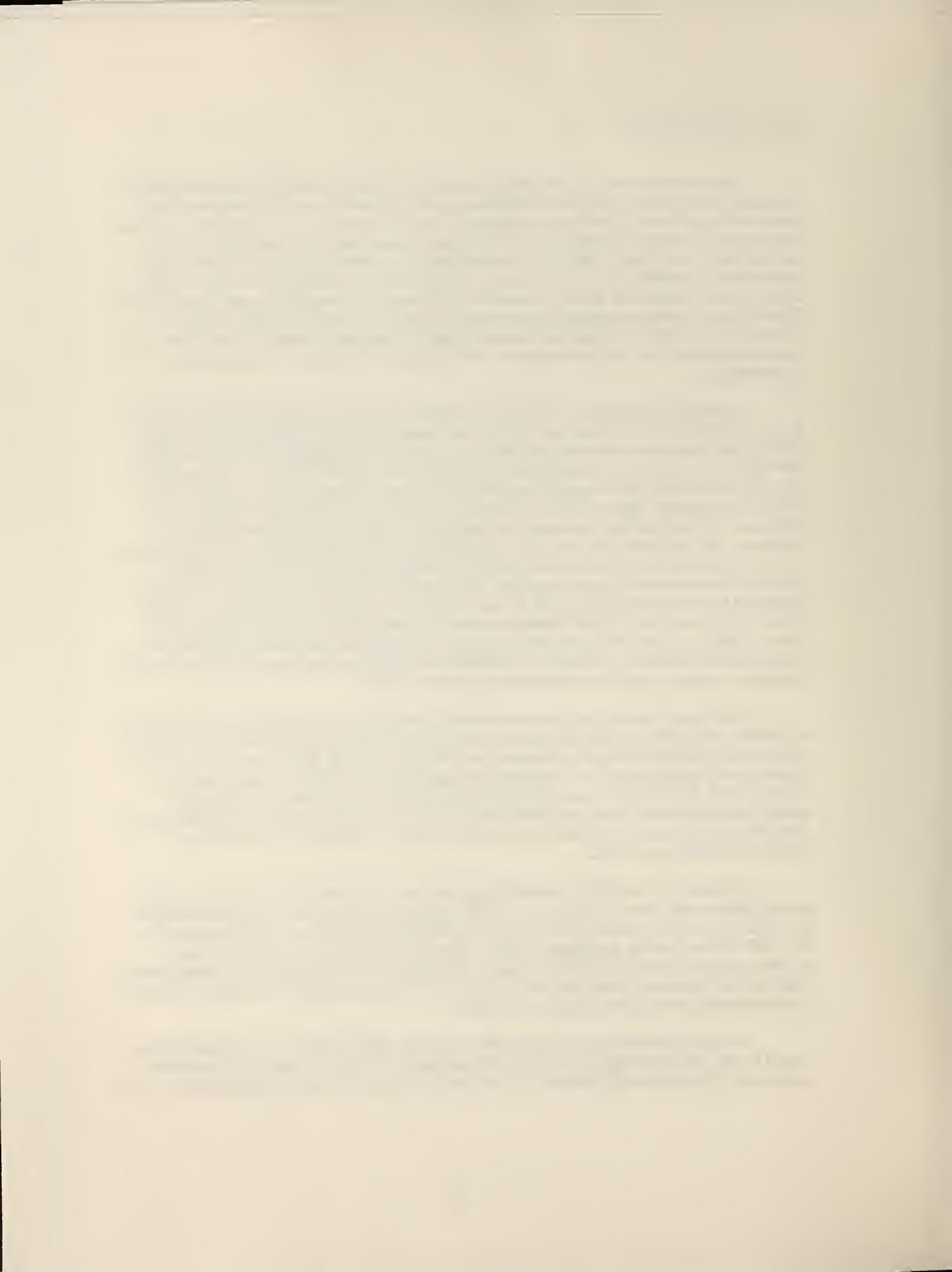
beneficiaries but is not included in the payment formula, payments to HMOs will be greater or less than their true actuarial value. If the payments to HMOs are greater than they should be because enrollees are healthier and/or cost less to care for than the AAPCC payment, this represents greater costs to the Medicare program. In addition, over time the nonenrollee "base" from which the AAPCC is calculated will consist of less healthy, "costlier" individuals, leading to spiralling payments to HMOs. Alternatively, if the enrollees are sicker or cost more to care for than is predicted from the AAPCC formula, the Medicare program may save money in the short run, but HMOs will not desire to contract to serve Medicare beneficiaries on a risk basis, and the use of risk HMOs as a cost containment strategy could fail.

The current reimbursement method, which takes no account of enrollee health status, gives HMOs the clear financial incentive to enroll healthier than average beneficiaries or those whose future costs of care are expected to be low (Welch, 1985a). Thus, it has been suggested that HMOs may attempt to attract healthy beneficiaries (Hellinger, 1987; Luft and Miller, 1988) through their marketing. These efforts could include structuring benefit packages to appeal to the healthy, promoting the HMO only to healthy individuals (such as at local Senior Olympics games), designing promotional campaigns to appeal to the healthy by stressing prevention or health maintenance, or making it difficult for infirm seniors to enroll. Alternatively, a concern of HMO executives is that the more generous set of benefits offered by HMOs, which usually includes coverage of the first day Medicare hospital deductible, no hospital copayments and, possibly, the coverage of prescription drugs, may attract less healthy individuals who expect to utilize these benefits.

The study described in this report was designed to examine the types of marketing activities engaged in by HMOs with TEFRA risk contracts, and to relate these activities to any risk selection the HMOs might experience. In this study, we selected a set of 22 HMOs with TEFRA risk contracts that planned to actively market their risk program to Medicare beneficiaries during the Spring or Summer of 1988. Data, including a functional health status measure, were obtained from Medicare beneficiaries who joined these HMOs during the study time period, and from a random sample of beneficiaries in the same cities who did not choose to join an HMO, through a mailed questionnaire. Data were also gathered about the variety of marketing activities used by the HMOs to attract new Medicare enrollees during the study period. The data collected included information about the direct promotional efforts of the HMOs, such as advertisements in mass media, membership meetings, and direct mailings to seniors. In addition, data were collected about other parts of the "marketing mix" such as the HMO's "product" (the features of the benefit package), "price" (the premium charged and any copayments or deductibles required), and "place" (location of services, numbers of service delivery points). Analyses were then conducted to examine relationships between risk selection and the marketing strategies of the study HMOs.
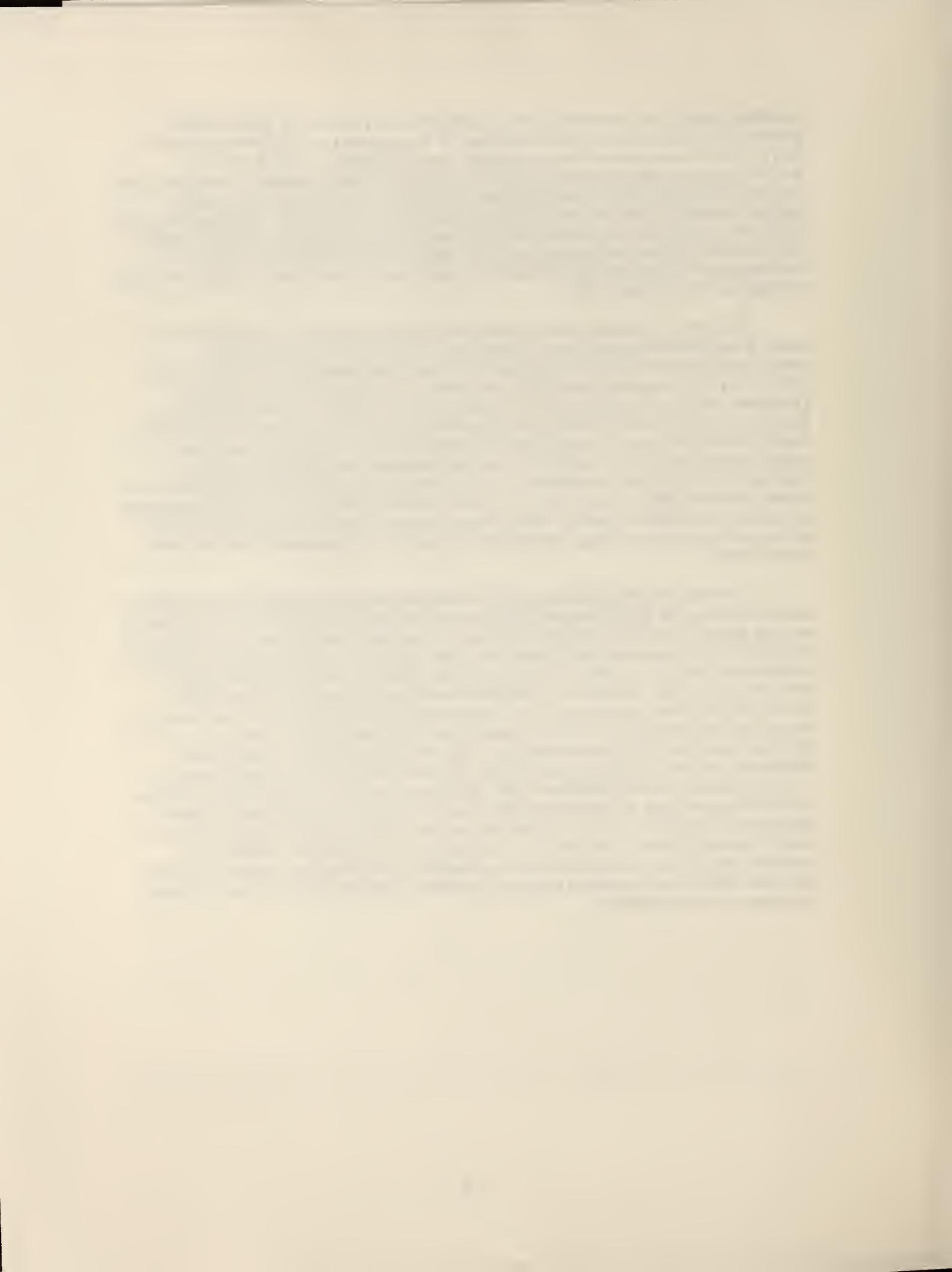
2.0. BACKGROUND

Risk Selection

Biased risk selection occurs when premium payments for health care do not equal actual costs because some, perhaps unknown, factor about the insured population which influences service use and costs is not included in the calculation of the payment (Wilensky and Rossiter, 1986). While the AAPCC formula includes adjustments for a variety of demographic factors (age, sex, institutional status and welfare status), it does not include any health status adjustment factor. Significant concerns have therefore been expressed by HCFA executives and by HMO managers about the presence of risk selection. HMOs are concerned that if they experience adverse selection, the cost of caring for Medicare enrollees will exceed the payments received from Medicare and from enrollee premiums (Iversen, Polich, and Oberg, 1987). There are concerns at the federal level that HMOs are experiencing favorable selection (GAO, 1986), which raises overall costs of the Medicare program (GHAA, 1989).

It is important to note that there are several methods through which risk selection may occur. "Self-selection" may occur among potential enrollees. One theory states that when individuals are able to choose among several health insurance options, their choice will reflect their expectations of future utilization and the costs associated with this utilization. According to this "risk perception hypothesis," individuals perceiving a higher need for health care will choose a more comprehensive plan (Berki and Ashcraft, 1980). Among the Medicare population, the "risk perception hypothesis" is highly relevant, since the Medicare regulations require beneficiaries to meet hospital and physician deductibles prior to Medicare payment for covered benefits, and many Medicare beneficiaries do not enjoy the benefit of employer contributions to cover the cost of supplemental health insurance.

In addition, there are a number of personal factors which have been discussed as influencing the decision to join an HMO, such as reluctance to leave a regular source of care to change to an HMO doctor (Berki and Ashcraft, 1980). This factor is highly relevant when considering Medicare beneficiaries, many of whom have probably developed a relationship with a physician because they are burdened with one or more chronic conditions. It is also possible that among the elderly, many of whom have had no prior experience with HMOs, certain individuals may be "innovators" and may be willing to try a new system of health care, while others perceive changes in their health care arrangements to be threatening and therefore would not consider enrolling in an HMO. Consumer researchers hypothesize that innovations in "services" (such as health insurance) diffuse more slowly than innovations in goods because of their intangibility, uniqueness, and complexity. Furthermore, consumers are hypothesized to be more "brand loyal" to services than to goods, because of costs associated with change, difficulty in obtaining awareness of substitutes, and higher perceived risks of change (Zeithaml, 1985).

There have been academic publications which contend that the AAPCC payment methodology presents strong incentives to HMOs to attempt to enroll only beneficiaries whose expected cost of care will be low (Welch, 1985a). Particularly in the Medicare sector, in which HMOs market to individual beneficiaries, it has been alleged that the HMOs may target their marketing efforts to attract healthy beneficiaries (Luft and Miller, 1988). Examples of these efforts could include the structure of the benefit package

(coverage of "sports medicine"), the placement of promotional materials (displays at health clubs, but not at nursing homes), the content of promotional messages (emphasis on staying healthy, rather than emphasis on management of chronic disease), and the manner in which the enrollment process is described (encouraging or "requiring" potential enrollees to visit the HMO, as opposed to stating that enrollment can be accomplished through the mail). While the potential effects of these types of marketing activities have been theorized, no empirical research has been undertaken to date to determine if these types of activities indeed occur, and if they do occur, what effect such activities actually have on risk selection. In response to specific instances of blatant marketing abuses that have occurred since the inception of the TEFRA risk program, HCFA and several states have instituted more stringent marketing guidelines designed to discourage blatant "targeting" of HMO marketing efforts toward healthy beneficiaries. (42 CFR Section 417.428, March 20, 1987; Rule 4-31.105, Florida Administrative Code, 1987) Despite these regulations, such blatant targeting and, more likely, more subtle forms of targeting might still occur.

Selection Experience of HMOs

Wilensky and Rossiter (1986) reviewed a number of studies about the risk selection experience of HMOs. Earlier studies examined selection experience within (non-elderly) employee groups, and were largely descriptive. In most of these studies, individuals chose between a traditional indemnity insurance plan and a closed-panel HMO (PGP), although in several studies the individuals could choose between several PGPs, an IPA and a traditional Blue Cross/Blue Shield plan. Differences between enrollees and nonenrollees on a variety of features, including demographics and attitudes, were measured in many of these studies. In addition, a variety of risk selection measures were used, including self-reported health status, pre-enrollment utilization, and existence of chronic health problems. These early studies generally concluded that HMOs experienced adverse selection or neutral selection. Later studies of risk selection among employed groups, however, generally found that HMOs experienced favorable or neutral selection. These studies examined choices between traditional health insurance plans and multiple HMOs, including open- and closed-model plans (Wilensky and Rossiter, 1986).

Selection Experience in HMOs with Medicare Risk Contracts

A number of more recent studies have focused on selection experience among Medicare beneficiaries. Eggers (1980) examined the selection experience of Group Health Cooperative of Puget Sound (GHC), the only HMO with a risk contract under Section 1876 of the Social Security Act. Comparing the pre-enrollment utilization of beneficiaries who enrolled during an open enrollment period in GHC (thus excluding Medicare enrollees who were GHC enrollees before reaching age 65) with the utilization of nonenrollees, Eggers found evidence of favorable selection for the HMO: enrollees in this closed-panel HMO had fewer inpatient days of care and lower inpatient reimbursements during a three-year pre-enrollment period. Eggers and Prihoda (1982) examined four years of pre-enrollment experience of Medicare enrollees in three HMOs which participated in the Medicare Capitation Demonstrations, and compared this experience to that of nonenrollees in the HMOs' service areas. Favorable selection was found in the two group-model HMOs, and neutral selection was found in the IPA-model HMO, based on a comparison of inpatient, outpatient, and total reimbursements. Kasper et al. (1988)
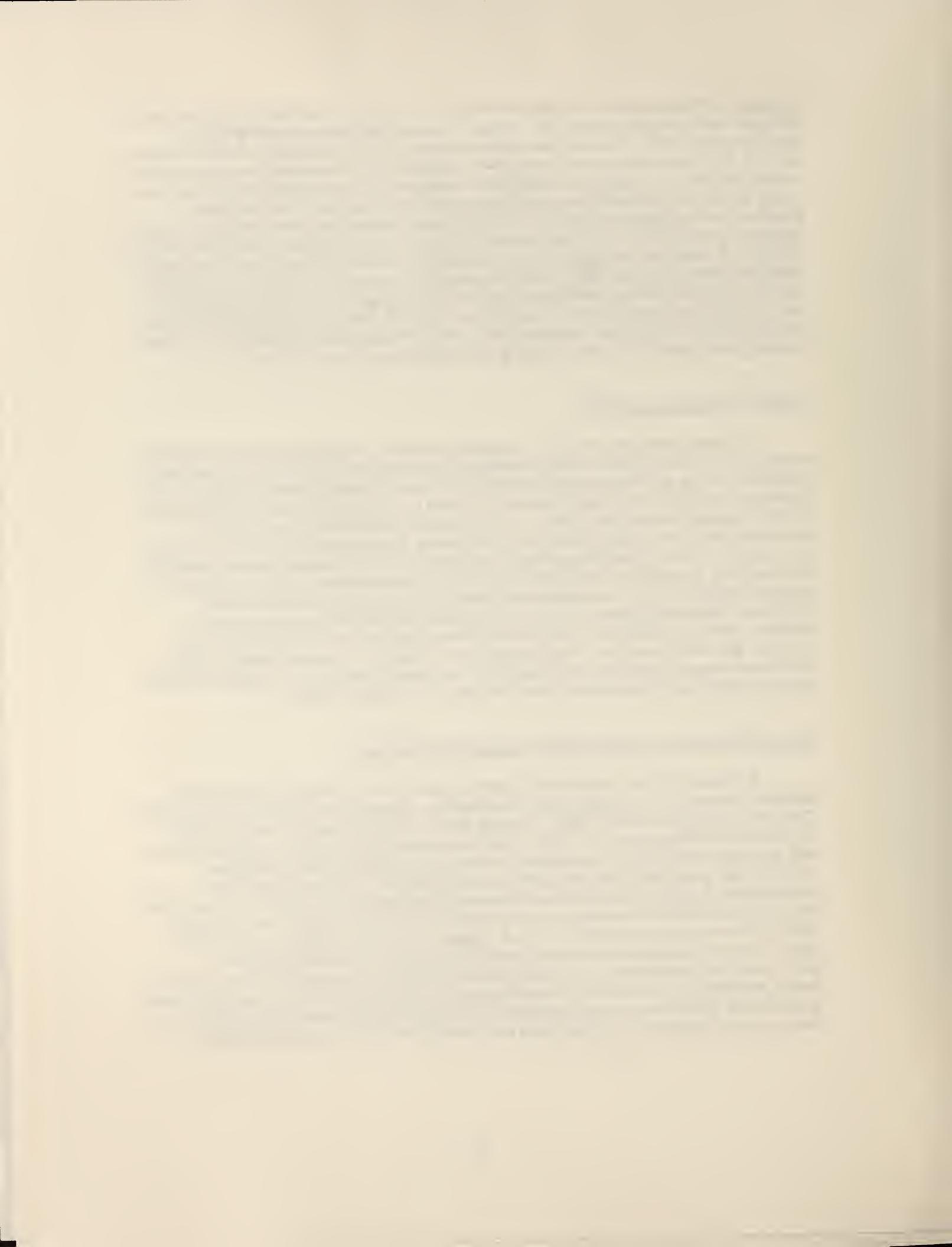
studied Medicare beneficiaries enrolled in two HMOs (one group-model HMO and one IPA-model HMO) which participated in the Capitation Demonstrations. This study examined differences between the enrollees and a comparable group of nonenrollees on self-reported health, mortality rates, and prior use and expenditures. The study also compared post-enrollment utilization rates and expenditures, based on the HMOs' reports of utilization and cost data, and HCFA's utilization and reimbursement data for nonenrollees. For the group-model HMO, favorable selection was found on all measures; for the IPA-model HMO, most measures indicated adverse selection.

Hellinger (1987) discusses a number of studies which have examined the utilization experience of Medicare beneficiaries, in which prior use has been shown to be a good predictor of future use. Measures of use included whether a beneficiary was hospitalized (Anderson and Knickman, 1984; Anderson, Resnick, and Gertman, 1982) and level of reimbursement (Eggers, 1981). However, Welch (1985a) has suggested that using a measure of prior utilization to assess risk selection may not be appropriate, because measures of utilization include the effects of both a permanent component of health (the underlying health status of an individual) and a transitory, acute component. Welch has shown that the transitory component is subject to "regression toward the mean." Welch (1985b) also suggests that studies that use prior utilization as a measure of risk selection may overestimate the degree of bias. Beebe (1988) used Medicare fee-for-service reimbursement data in a simulation model of costs for random groups of Medicare beneficiaries with low and high prior use. This simulation model found that all groups regressed toward the mean, but did not regress entirely to the mean, even after 7 years. Riley et al. (1989) examined the mortality experience of three Capitation Demonstration HMOs and compared it to the experience of comparison groups of nonenrollees, and found that enrollees had lower mortality rates, particularly in the first year after enrollment, but that the mortality rates regressed toward the mean. In two of the HMOs (one group-model and one IPA-model), this regression toward the mean occurred over only two years, at which time the mortality of the enrollees and nonenrollees was not significantly different. At the third HMO, a group-model HMO, the mortality experience was similar to that found by Beebe (1988) for expense data, and the regression toward the mean in mortality occurred over six years.

Mathematica Policy Research, Inc. (MPR) has evaluated the Medicare Competition Demonstration program, which began in 1982 and was the immediate predecessor of the TEFRA risk contracting program. MPR has examined aspects of these Demonstrations including the implementation of the risk contracts, quality of care, enrollment and disenrollment experience, current utilization and costs, and biased selection (measured in terms of prior reimbursements and post-enrollment mortality). In Brown et al. (1986), descriptive results of comparisons of enrollees and nonenrollees are presented. Comparing enrollees with nonenrollees on the four AAPCC factors, enrollees were younger, more likely to be female, less likely to live in a nursing home, and less likely to be eligible for Medicaid. In addition, enrollees were poorer, less likely to have Medigap coverage prior to enrollment, and reported somewhat better health than nonenrollees. Brown and Langwell (1988) present comparisons of characteristics related to access, including prior source of care, satisfaction with prior source of care, perceived health status, and self-reports of prior utilization. Enrollees were less likely to have a prior regular source of care and were less likely to be satisfied with their source of care if they had one. Enrollees were more likely to report having a health problem and less likely to

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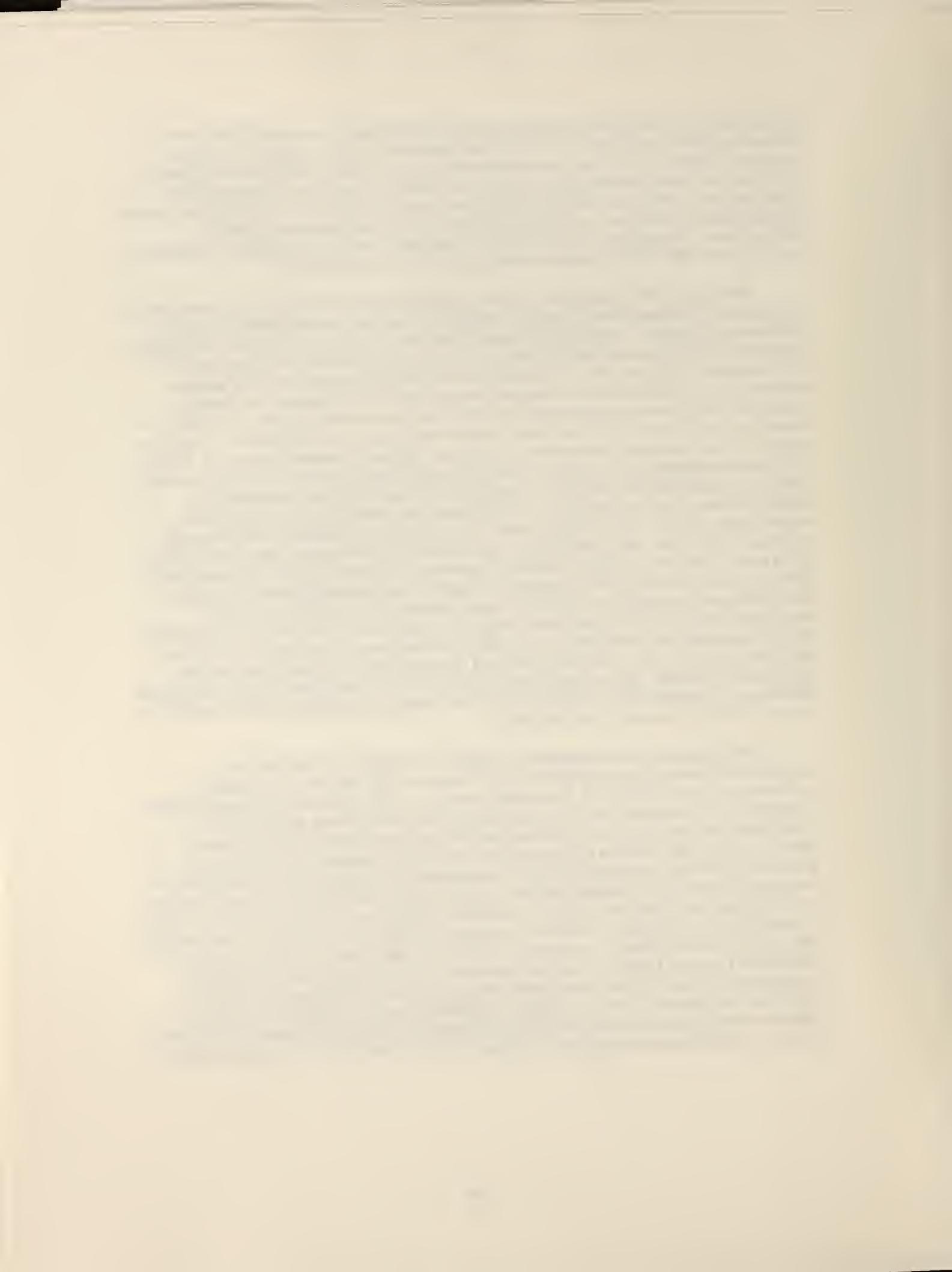
report having a physical examination in the past year. Enrollees who were "rollovers" (that is, able to retain the same physician after enrollment) were compared with "switchers" (those who were required to change to a different physician upon enrollment). "Switchers" were less likely than "rollovers" to have had a physical exam in the year prior to enrollment, and more likely to have a health problem requiring hospitalization.

Brown (1988) reports on biased selection in the Medicare Competition Demonstration using two measures: Medicare reimbursements in the two years prior to enrollment, and post-enrollment mortality experience. After adjusting data to account for differences in the AAPCC cell factors (age, sex, Medicaid buy-in status and institutional status) between enrollees and nonenrollees, average total reimbursements in the two years prior to enrollment for enrollees are 21% below average total reimbursements for nonenrollees. This study also found that the IPA model and mixed model HMOs were much less likely to experience favorable selection, as measured by prior reimbursements, than group and staff model HMOs. For a subset of the enrollee and nonenrollee samples, hospital stays and diagnoses in the two years prior to enrollment were also analyzed. Overall, enrollees were significantly less likely to have been hospitalized, and significantly less likely to have had high-cost discharge diagnoses. By model type, enrollees in IPA-model HMOs did not exhibit significant differences from nonenrollees; however, significant differences in hospital stays and discharge diagnoses were found for enrollees in the other three model types (group, staff, and mixed) when compared to nonenrollees. An examination of overall post-enrollment mortality rates indicates that enrollees experienced significantly less mortality than nonenrollees. This relationship held true for all model types, and an examination of individual plans showed that in 12 of the 17 plans studied, enrollees experienced significantly less mortality than nonenrollees.

In another study (GAO, 1986) the General Accounting Office concluded that Medicare capitation payments to risk-contract HMOs were "excessive" because enrollees in 27 Medicare demonstration HMOs were found to be healthier than the general Medicare population. The basis for this conclusion was that HMO enrollees had mortality rates that were only 77 percent of the actuarially projected levels adjusted for age, sex, Medicaid status and institutional status.

To summarize the literature on risk selection among Medicare beneficiaries who join HMOs, studies have generally found favorable selection, using a variety of measures of risk selection. However, based on the results reported in these studies, it cannot be determined if the results are due solely to self-selection, or whether marketing activities of the studied HMOs had an impact on the risk selection experienced.
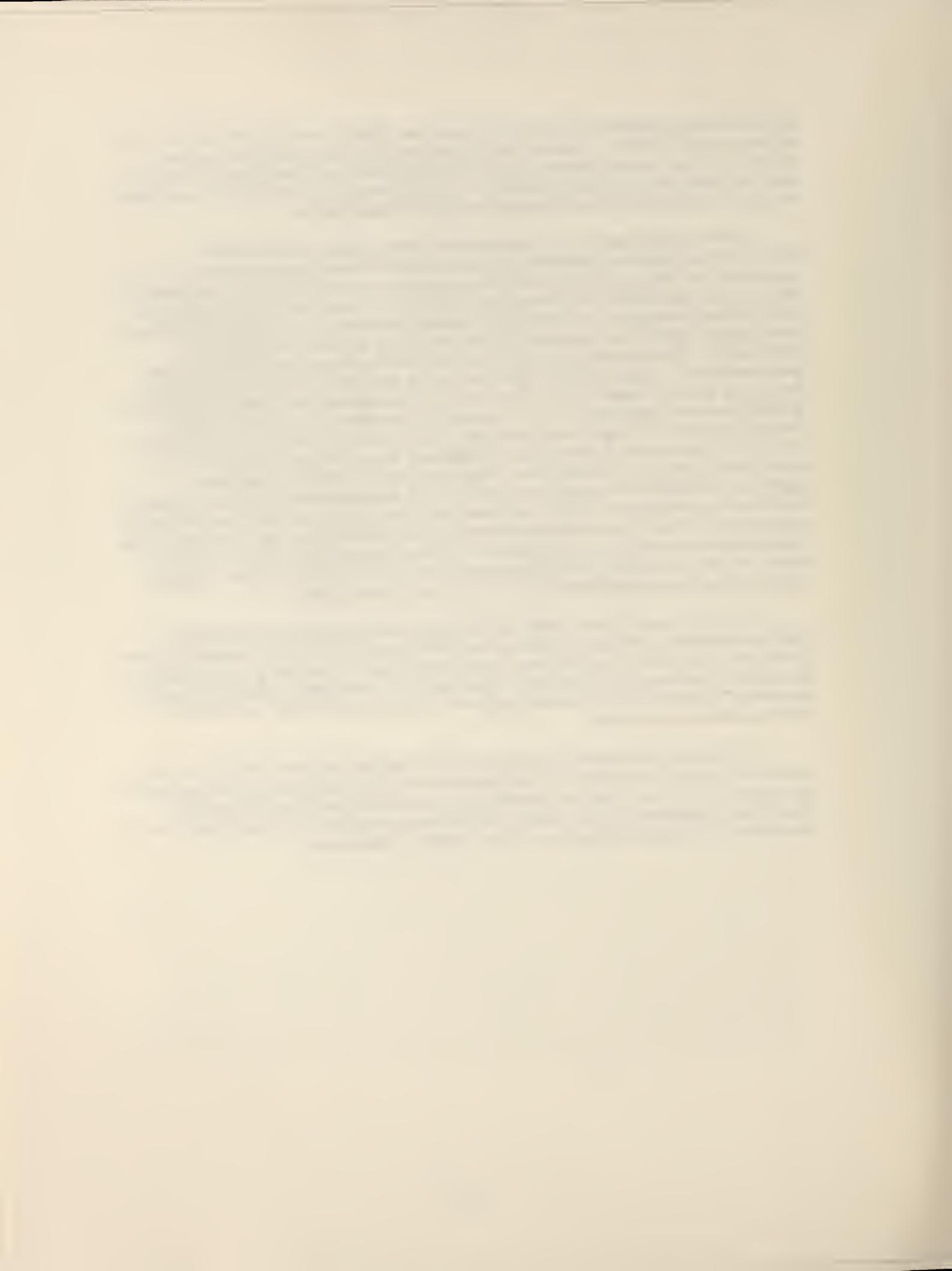
3.0. METHODOLOGY

In this section, the hypotheses to be investigated in this research project are identified. Based upon these hypotheses, the data requirements are defined. Data collection activities and construction of measures which can be used in hypothesis testing are discussed. Lastly, the analytical approach used to perform tests of the hypotheses of interest is discussed.

The study involved a number of interrelated tasks. Preliminary tasks included selection of study HMOs, determination of the appropriate study time period for each HMO, and the identification of Medicare beneficiary samples (enrollees in HMOs and nonenrollees). Data to be collected included a measure of beneficiary health status and measures of HMO organizational and marketing variables. Comparisons of the health status of enrollees and nonenrollees were undertaken in order to create a "risk selection variable." Lastly, relationships between the risk selection variable and organizational and marketing variables were tested, using a variety of statistical methods.

3.1. OBJECTIVES AND HYPOTHESES

In our proposal, we hypothesized a relationship between an HMO's marketing activities and the degree of risk selection it experiences. Initial conceptual tasks concerned ways in which to define and measure the marketing activities and other features of the HMOs which might be related to risk selection among Medicare beneficiaries. In addition, although the proposal identified the dependent variable in this study as the difference in functional health status between enrollees and nonenrollees, and proposed a set of questions which would generate this measure, activities were undertaken to refine the set of functional health status questions.

3.1.1. HYPOTHESES

Based upon the literature and our own observations, the following relationships are hypothesized:

I. There will be a difference in health status and in average age between enrollees and those remaining in the FFS system.

    a. Those who enroll in Groups will be younger and have higher average functional health status than those remaining in FFS.

    b. Those who enroll in IPAs will be older and have lower average functional health status than those remaining in FFS.

    c. Those who enroll in Groups will be younger and have higher average functional health status than those who enroll in IPAs.
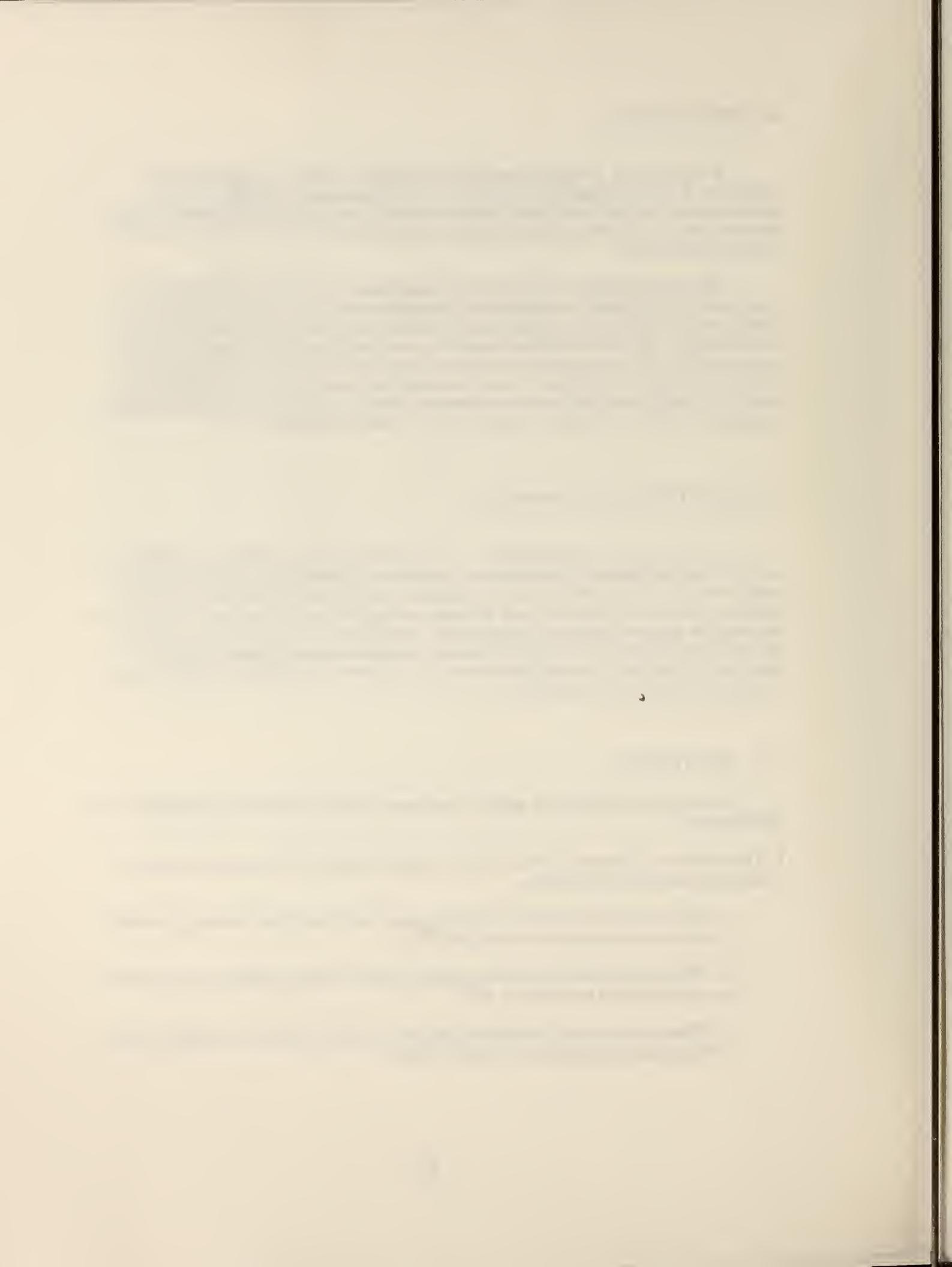
II. The risk selection experience of HMOs will be influenced by certain organizational features, such as model type, the profit status of the HMO, whether or not the HMO is a member of a chain, the method of payment of HMO physicians, the age of the HMO, the HMO's previous experience with Medicare beneficiaries, and the HMO's size (overall number of enrollees, and number of Medicare enrollees); and by certain market characteristics, such as the number of Medicare beneficiaries in the market area, the total population of the market area, the number of TEFRA risk enrollees in the market area, and the penetration rate of HMOs among Medicare beneficiaries.

     a. HMOs with more experience in risk contracts for the elderly will enroll healthier Medicare beneficiaries than those with little or no experience.

     b. HMOs in markets with low penetration rates among Medicare beneficiaries will enroll healthier beneficiaries than HMOs in markets with high penetration rates.

     c. Other organizational features and market area features may have a relationship to risk selection, and these relationships will be examined on an exploratory basis.

III. There is a relationship between an HMO's marketing activities and the degree of risk selection experienced:

Product: Specific services or benefits (the "Product") will appeal to healthy or sick seniors as follows:

Benefits:	
Preventive visits	Healthy
Dental	Healthy
Vision, Hearing	Healthy
Prescription drugs	Sick
SNF, ICF, other long term care	Sick

Organization of Services:	
Restrictions on Specialists	Healthy
Use NPs/PAs for Primary Care	Healthy
Restricted choice of hospitals	Healthy
Affiliation with prestigious Hospital or Medical Group	Sick

Price: The higher the price of the HMO, in relation to the price of Medigap insurance, the more likely the HMO will be to experience adverse selection (the risk-vulnerability hypothesis).

Place: Certain aspects of "Place" will attract healthy or sick seniors: plans with more service locations will tend to attract sicker individuals, while plans with few locations will not attract sicker individuals.

IPA-model HMOs, which tend to have more locations, are more likely to experience adverse selection.

Group models with a central location are more likely to experience favorable selection due to higher average travel time and distance.

Group models with a number of sites are more accessible, and are less likely to experience favorable selection than those with a central location.

Promotion: The amount of promotion and the types of promotion will affect the risk selection experience of the HMO.

The more spent on advertising, the more likely the HMO is to experience favorable selection.

HMOs that use mass media (TV, radio) will attract a cross-section of the Medicare population.

HMOs that use personal marketing (direct mail, meetings, etc.) will be able to target their marketing efforts toward healthier people.

Content Analysis: The content of advertisements is an element of marketing that can affect risk selection.

Stressing certain plan features will appeal to sick beneficiaries:
Ease of access (little effort to enroll, multiple sites, minimal paperwork)
Additional benefits (drugs, prestigious specialists and hospitals)

Stressing certain features will appeal to healthy beneficiaries:
Restrictions on providers
Additional benefits (health education, regular physical exams, preventive services)

Aspects of the presentation of ads will appeal to healthy or sick seniors as follows:

Characters:
Females   Healthy
Whites   Healthy
Active-looking seniors   Healthy

Scenario:
Out-of-doors   Healthy
Indoors   Sick
In bed   Sick
At doctor's office   Sick

Support Networks:
Showing larger support networks   Healthy

Showing smaller support networks	Sick
Level of physical activities:	
Strenuous	Healthy
Passive	Sick

The appearance of more "treatment-related items" such as drugs, canes, hearing aids, etc., will lead to adverse selection.

The "pace" (speed, number of words, etc.) of the presentation will affect risk selection: a slow to moderate pace (versus fast pace) will be easier for ill seniors to follow.

Redundant information (e.g., presenting the same information through audio and visual tracks of an ad) will be easier for ill seniors to follow.

Presentation of a greater quantity of information will lead to adverse selection. (This hypothesis was developed after information from a focus group indicated that seniors with more health concerns wanted more substantive information in HMO advertisements and brochures and fewer "slick" slogans and pictures.)

Process of Enrollment: The process of enrollment can be conceptualized as spanning a continuum from "easy" for a sick person to negotiate, to "difficult" for a sick person to negotiate. The more "difficult" the steps in the process are, the more likely the HMO is to experience favorable selection, and the "easier" the steps are, the more likely the HMO is to experience adverse selection.

3.1.2. MEASUREMENT OF HEALTH STATUS

The proposal discussed ways in which differences in health status could be measured. Other efforts to study risk selection have examined prior utilization of health services or prior costs. As discussed in Section 2.0. above, these measures have been criticized (Welch 1985a), and may not be appropriate measures of risk selection.

Therefore, we proposed to use a measure of functional health status, which focuses on the underlying health of individuals rather than on the transitory component. As shown in our previous research, functional health status measures are stable over time (Lichtenstein and Thomas, 1987), and have predictive validity in terms of health services utilization (Thomas and Lichtenstein, 1986). The functional health status scale we proposed to use was the Physical Capacities Index developed by the Rand Corporation as part of their Health Insurance Experiment (Stewart et al., 1981, Stewart et al., 1982). This Index includes a range of items, from ADL activities ("Can you eat without help?") to some quite strenuous activities ("Can you do hard activities at home, heavy work like scrubbing floors, or lifting or moving heavy furniture?"). We also proposed to supplement this scale with the inclusion of several items from the Rand Corporation's Functional Limitations Battery. The Functional Limitations Battery includes questions about mobility, physical activity, and general limitations. We proposed to include five "performance" items from the "more disabled" end of this Battery (an example is "Do you have to stay indoors all or

most of the day because of your health?"). Using the Physical Capacities items along with some of the Functional Limitations items yielded a 17 item scale. Prior to conducting the survey of the beneficiary samples in the study sites, this scale was modified based on the results of pretesting. Details of the pretesting activity and the modified health status items appear in section 3.2.4. below.

3.1.3. MEASUREMENT OF BENEFICIARIES' "SALIENCE" AND "BELIEFS"

Subsequent to the original proposal, the marketing expert on our project staff identified an additional type of data relevant to the examination of the relationship of marketing activities and risk selection: the importance (salience) that beneficiaries attach to certain features of health care that may be offered by HMOs, and beneficiaries' beliefs about the availability of these features in specific (named) HMOs.

There is a large body of literature in marketing and psychology which suggests that consumers consider and evaluate many product attributes (features/benefits) when making a purchase. There are many theoretical variants of this multi-attribute choice model (e.g., Engle, Blackwell, and Miniard, 1986; Ajzen and Fishbein, 1980; Kotler, 1984), but in each instance, these models propose that product choice is the result of the buyer evaluating the purchase alternatives using some combination of product beliefs and the relative salience of each belief. This approach generalizes to the following.

When faced with a purchase decision, consumers first establish a set of evaluative criteria, which vary according to the nature of the purchase. In most cases the evaluative criteria are described in the form of product attributes. For example, when choosing among health care options, the ability to select one's own preferred provider may be an evaluative criterion. Once the set of evaluative criteria has been established for a given purchase, consumers then form beliefs regarding the level of performance offered by the competing alternatives on each evaluative criterion. Beliefs are the consumer's perceptions of performance on each criterion. Additionally, the criteria may vary in salience across consumers. Salience refers to the potential influence (i.e., relative importance) each criterion may exert during the comparison process. Thus, for example, the ability to choose one's own physician may have greater salience than the geographic proximity of the provider's office for some consumers. Various theoreticians have posited different approaches for combining beliefs and salience as inputs to consumer judgments (Engle, Blackwell, and Miniard, 1986; Kotler, 1984), but one frequently used procedure is to use a multiplicative model such that preference is a function of the sum of each belief multiplied by its salience. The alternative with the highest preference is then predicted to be the one chosen. Thus, it is possible to influence choice by altering either beliefs or salience in the desired direction.

In order to determine whether certain HMO marketing activities were attracting healthier or sicker beneficiaries, measures of beneficiaries' salience and beliefs would be required. These measures would allow us to test whether certain features of HMOs are more salient to sicker individuals or healthier individuals, and whether the risk selection experience of the HMOs reflects this relationship.

3.1.4. MEASUREMENT OF ORGANIZATIONAL FEATURES AND MARKET-SPECIFIC FEATURES

The proposal outlined a number of dimensions of HMO performance or existence that can be considered part of the total marketing efforts of HMOs. In the marketing literature, these dimensions have been characterized as "The Four Ps of Marketing" and include Product, Price, Place, and Promotion (Kotler, 1984). We have identified a fifth P that may have relevance in this study: Process of Enrollment. Examples of Medicare HMO marketing dimensions and their place in the "5 Ps" framework include: range and type of benefits offered, e.g. Prescription Drugs (Product); the level of copayment required for a visit with a primary care provider (Price); the number and location of delivery sites (Place); the volume of advertising and the media used (Promotion); and an HMO requirement for or recommendation to potential enrollees to attend a meeting at the HMO or to tour the HMO facilities (Process of Enrollment). We hypothesize that specific features of HMOs and HMO markets, as well as promotional activities designed to attract new members, may be related to risk selection.

There is a small body of literature on Medicare beneficiaries' decisions to join HMOs, where HMO marketing was considered as a factor in this decision. Early studies conceptualized marketing as "the promotional efforts of HMOs," measured in terms of volume of advertising and the extent to which Medicare beneficiaries had been exposed to this advertising. As discussed in Brown, et al. (1986), Garfinkel et al. (1984) conceptualized marketing as a single dimension, "exposure to marketing," for each individual beneficiary. Friedlob and Hadley (1985) examined marketing by four Minneapolis-area HMOs participating in the Medicare Capitation Demonstrations. They describe the promotional efforts of the four HMOs, whether Medicare beneficiaries had heard about the plans, and the main reason given by enrollees for their choice of plan. While the "main reasons" listed include aspects of Place (convenient location) and Product/Price (good benefits and coverage, good quality of care), these attributes are not examined as dimensions of marketing itself. Brown et al. (1986), in studying enrollment and disenrollment in the Medicare Competition Demonstrations, collected information on characteristics of each plan (such as length of time the plan had been in operation) and each market (such as AAPCC rates), and described personal characteristics of enrollees and non-enrollees by market area and model type. They examined two aspects of marketing: beneficiaries' sources of information about Medicare HMOs, and the source most influential in enrollees' decisions to join.

More recent studies examine the marketing efforts of Medicare HMOs in a broad manner, but do not relate these marketing activities to the enrollment decision or risk selection. Langwell and Hadley (1986b) review the marketing strategies of 20 HMOs with Demonstration Contracts, and discuss two categories of marketing activities: (1) strategic planning, including product design, location of services delivery, and "positioning" of the product; and (2) promotional activities designed to inform and to sell the product. They discuss the effect of organizational characteristics (including profit status, model type, years of experience) and market characteristics (AAPCC level in the community, number of HMOs in the market involved in Medicare risk contracting) on the marketing strategies of the HMOs. Langwell et al. (1987) discuss strategic planning by HMOs with demonstration contracts in terms of product design (benefits, copayments, premiums) and

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marketing strategies (mass marketing and individual marketing), and describe the experience of these HMOs in terms of numbers of new enrollees, post-enrollment utilization experience, financial results, and provider response. We have found no mention in the literature of studies relating specific components of the HMO marketing package or mix to risk selection experience.

Data requirements for this study were defined using the 5 Ps of Marketing and the previous literature to form a conceptual framework for examining aspects of the HMO model, benefit package, premium and copayments, and promotional activities. Discussions with staff at potential study HMOs led to refinements and additions to the data requirements.

Practical considerations of the study led to a standard methodology for collection of data related to the broadly-defined marketing efforts of each HMO. Two questionnaires were designed (see Appendices A and B), to be completed by HMO administrative staff. Data collection protocols were as broad as possible, in order to obtain information about every aspect of marketing by the HMOs.

3.1.4.1. ORGANIZATIONAL FEATURES

Another set of relevant variables for relating marketing and risk selection involves the organizational structure and other organizational features of the HMOs. The following is a description of the types of variables, the rationale for including them, and the measures of the features that we utilized. Table 1 presents a complete list of the variables created to describe the organizational features. Abbreviated variable names included in this Table are used in Section 4.5, where results of analyses of the relationship between risk selection and these variables are presented.

Model Type. Traditionally, the literature about HMOs has recognized three different HMO models: Group, Staff, and IPA. Preliminary contacts with staff at HMOs indicated that, while most HMOs describe themselves as either a "Group" or "Staff" or "IPA" model HMO, there were a number of "network" HMOs that are hybrids of the three traditional models. Some HMOs that define themselves as being a pure model actually contain characteristics of more than one model in their delivery system. For example, in addition to employing physicians to deliver care, a Staff model HMO may contract with a group or with individual physicians in order to expand its delivery system. It became apparent that it was not possible to rely on published data about HMOs to classify them as to model type. Due to the rapidly changing nature of the HMO industry, these data can quickly become obsolete. Also, definitions of the model types and reporting conventions differ from source to source. For example, in the Monthly Reports of TEFRA HMO/CMP Contracts published by the Health Care Financing Administration, model type is limited to designations of Group, Staff, or IPA. InterStudy annually publishes data about the HMO Medicare risk program (Iversen & Polich, 1987; Pitt, 1988), and categorizes HMOs as Group, Staff, IPA, or Network. Among the HMOs defined by InterStudy as Networks are HMOs designated by HCFA as Group, Staff, and IPA.

TABLE 1
ORGANIZATIONAL AND MARKET AREA VARIABLES

Maturity Variables

YrsOperation	Years the HMO has been in operation
YrsAtRisk	Total years the HMO has contracted to serve Medicare beneficiaries on a risk basis
YrsMedicare	Total years of Medicare (HCFA) experience prior to TEFRA
YrsElderly	Total years of experience with elderly population prior to TEFRA (includes supplements)
YrsTEFRA	Years since start of TEFRA contract
Demonstration	HMO had Demonstration contract
Cost	HMO had Cost contract
HCPP	HMO had HCPP contract

HMO Size

TotalEnroll	Total enrollment in the HMO
TEFRAEnroll	Total TEFRA Medicare enrollment
MedicareEnroll	Total HCFA Medicare enrollment (all contracts)
TEFRA/TotEnroll	TEFRA enrollment as % of all enrollment in the HMO
TEFRA/MedEnroll	TEFRA enrollment as % of all Medicare enrollment in the HMO

Model

Profit	HMO is for-profit (yes/no)
Chain	HMO is part of a chain (yes/no)
OwnerChange	# of ownership changes since 1983
HCFAModel	HMO model type per HCFA printout
DeliverGroup	HMO's service model includes delivery as a Group
DeliverIPA	HMO's service model includes delivery as an IPA
DeliverStaff	HMO's service model includes delivery as a Staff-model
DeliverNetwork	HMO's service model includes delivery as a Network
PCPayment	Method of paying Primary Care physicians
PCRisk	PC physicians engage in risk sharing (yes/no)
PureStaff/Group	HMO is a pure Staff or pure Group model HMO
PureIPA	HMO is a pure IPA-model HMO

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Mission

ElderlyTarget	Characterization of HMO's target for enrollment levels for elderly
Target1988	Target # of new Medicare enrollees for 1988
ElderlyMission	Characterization of HMO's mission to elderly (community-oriented, enrollment-oriented, or bottom-line oriented)
QualityMission	Quality is explicitly mentioned in HMO's mission
FeetWet	HMO's reasons for being in Medicare risk contracting include getting experience with this population
NeedExists	HMO's reasons for being in Medicare risk contracting include need which exists in the service area
ElderlyDemogs	HMO's reasons for being in Medicare risk contracting include demographics of elderly population
Mission	HMO's reasons for being in Medicare risk contracting include mission
Material	HMO's reasons for being in Medicare risk contracting include material reasons (profit, bottom-line, etc.)
EmployerWant	HMO's reasons for being in Medicare risk contracting include demands of employer groups

Market Area: Market Size/Penetration Rate

MedicareMarket	# of Medicare beneficiaries in market area
TEFRAEnrMarket	Total # of TEFRA enrollees in market area
HCFAEnrMarket	Total # of Medicare enrollees in all types of contracts in market area
TEFRAPen	TEFRA penetration rate in market area
HMOMedPen	HMO's Medicare enrollment as % of all Medicare enrollment in market area
MarketPop	Total population of market area (all ages)
EnrollMarket	# of HMO members (all ages) in market area
MarketPen	Overall market area penetration rate (all ages)

Market Area: Prices

Medigap	Monthly premium for the most popular Medigap policy in the market area

Due to these problems, other features of HMOs were included in data used to determine model type. These additional features include the number of delivery sites, the number of primary care physicians affiliated with the HMO, and how many of them were accepting new Medicare patients, the number of hospitals available to HMO members, and whether the entire delivery system, or only a subset of providers, is available to Medicare enrollees.

Size, Chain Membership. Larger HMOs, and HMOs that are members of chains, may have different experience in enrollment of Medicare beneficiaries. For example, in a large organization or a chain, the personnel may be more sophisticated in designing marketing campaigns to enroll Medicare beneficiaries. Size of the HMO was measured in terms of number of TEFRA enrollees and number of enrollees of any type. HMOs which were owned by a chain or had a contractual relationship (including a management contract) with a chain were defined as being members of chains.

Maturity. HMOs that have been in existence longer, or have been serving Medicare beneficiaries longer, may be able to use this experience in designing marketing strategies. Maturity is measured in several ways: presence of a HCFA demonstration risk contract, number of years of operation, number of years serving Medicare beneficiaries on a risk basis (or on any basis).

Mission, Profit status. The "mission" of an HMO may influence the marketing strategies used, as may the profit status of the HMO. HMO staff were asked to describe the mission of the HMO, and in some cases were able to provide a copy of the written mission statement. Project staff attempted to create variables which would characterize HMO mission, but were unable to develop reliable variables for this feature of HMOs. Problems arose in those HMOs that had no written mission statement. Due to the ambiguity and inconsistency of statements made by HMO staff during interviews, we were unable to reliably classify the mission of these HMOs. Therefore, the whole set of mission variables was eliminated. The profit status of each study HMO was measured simply as For Profit or Not-for-Profit.

3.1.4.2. MARKET-SPECIFIC FEATURES

A set of variables relating to the city or "market area" was also constructed. The following section includes a description of the types of variables and the rationale for including these variables in the study. Table 1 presents a complete list of the variables created to describe the market-specific features.

HMO Market Penetration Rate. This feature of markets was seen as very important to this study, for several reasons. Most important is the hypothesized relationship of penetration rate to the ability of an HMO to "skim." If HMOs do indeed successfully enroll the healthy beneficiaries first, a market with a high penetration rate might contain proportionately fewer "healthy" potential enrollees, compared to a market in which TEFRA risk HMOs have a low penetration rate. Rossiter and Adamache (1987) found that, from 1983 to 1986, the proportion of older enrollees (aged 80 and over) in the risk program increased, providing some support for the hypothesis that as the HMO market share increases, selection into lower risk groups diminishes. In addition, in a market in which a significant proportion of Medicare beneficiaries are members of HMOs,

the average level of awareness of HMOs or knowledge about HMOs would probably be much higher, and might affect the impact of marketing activities on potential enrollees. Brown (1988) states that in counties with a higher HMO penetration rate among Medicare beneficiaries, non-enrollees are more likely to have encountered someone who has enrolled in an HMO, and will therefore be more likely to enroll based on advice from these friends or relatives. The HMO market penetration rate is computed as the percentage of Medicare beneficiaries in a market area who have enrolled in TEFRA risk plans.

Competition and Typical Medigap Premium. Individuals who perceive themselves to be vulnerable to the risk of needing health care will be more likely to choose a health insurance plan that provides more complete coverage, and will be more willing to pay a higher premium (Berki and Ashcraft, 1980). Because the HMOs chosen to be in this study are located in 12 different cities and such factors as AAPCC rates and other price-related variables are likely to vary across cities, it would be inappropriate simply to measure the premium required by these HMOs and compare them. Thus, in order to adjust HMO premiums for the price competition they faced locally, we defined a "standard" against which the HMOs were competing for new Medicare members, i.e., the price of a popular Medigap policy in the same community. Several aspects of this standard, including the names of the health insurance plans identified by HMO representatives as "the competition," the benefit packages, and the base premiums for these plans, were investigated. In most cases, Medicare supplemental plans offered by Blue Cross/Blue Shield plans were identified as being part of the "competition" and we therefore obtained information on the benefits and premiums for these plans directly from the various Blue Cross/Blue Shield organizations. In cases in which more than one plan was offered by a Blue Cross/Blue Shield plan, information about the most popular plan during the study period was used.

3.1.5. MEASUREMENT OF MARKETING ACTIVITIES

In addition to collecting data about organizational and market area features, it was crucial to obtain information about the HMOs' marketing efforts, including the benefit package offered, the price of the benefit package, and the specific promotional efforts of the HMOs. Table 2 presents a complete list of the variables created to describe the marketing efforts of the HMOs. Abbreviated variable names included in this Table are used in Section 4.5., where results of analysees of the relationship between risk selection and marketing activities are presented.

Benefit Package and Price. In addition to descriptive variables about the HMO organization, it was necessary to examine the benefit packages available to Medicare beneficiaries, and the associated premiums and copayments. Collection of these data was quite straightforward. HCFA protocols for review of HMO/CMP marketing materials discuss the requirement that HMOs should include an "easy to read chart of benefits" in their marketing materials (personal communication from HMO Program Representative, HCFA Chicago Regional Office).

TABLE 2
MARKETING VARIABLES

Product: Prestigious Affiliations

PrestHosp   HMO affiliated with prestigious hospitals
PrestMedGroup   HMO affiliated with prestigious medical groups

Product: Benefits (in excess of Medicare coverage)

PrescrDrugs   HMO covers prescription drugs at any level
Dental   HMO covers dental care
Vision   HMO covers vision care
Glasses   HMO covers eyeglasses
Hearing   HMO covers hearing care
HearingAid   HMO covers hearing aids
RoutineFoot   HMO covers routine foot care
Allergy   HMO covers allergy testing
MentalOut   HMO covers mental health outpatient visits
MentalIn   HMO covers mental health inpatient visits
PhysTher   HMO covers physical, speech, or occupational therapy
SNF   HMO covers Skilled Nursing Facility care
BloodProduct   HMO covers blood products
DME   HMO covers DME, prosthetic or orthotic appliances
HomeHealth   HMO covers Home Health Care

Price

Options   # of different benefit packages available to Medicare beneficiaries
BasePremium   Monthly premium for basic Medicare benefit package
EnrPremium   Monthly premium for enriched Medicare benefit package
PriceCompare   Price of basic benefit package as % of most popular Medigap policy in the market area

CopayHosp   Copayment required for some or all inpatient hospitalizations (yes/no)
CopayPCOffice   Copayment required for Primary Care office visits
CopayDrug   Copayment required for covered prescription drugs
CopayDental   Copayment required for covered dental care
CopayVision   Copayment required for covered vision care
CopayHearing   Copayment required for covered hearing care
CopayDME   Copayment required for covered DME, prosthetic, or orthotic appliances etc.

MARKETING VARIABLES

Place

OpenMD	HMO physicians provide services on a regular basis to non-HMO patients
Gatekeeper	HMO uses gatekeepers (yes/no)
PCPhysicians	# of Primary Care physicians
NumberSites	# of delivery sites
MileageLim	Mileage limitations imposed for enrollment
NumRegHosps	# of community hospitals with which the HMO is affiliated
SpecHosps	# of additional hospitals with which the HMO is affiliated, for specialty care only

Promotion: Budget

TotAdvert	Total advertising budget for 1988
Mktg/Admin	% of HMO administrative budget to be spent on marketing for entire HMO for 1988
Admin/Budget	% of total HMO budget to be spent on administrative expenses for 1988
%Advert	% of advertising budget for 1988 which is to be spent during 5-month study period
TEFRAAdvert	TEFRA advertising budget which is to be spent during 5-month study period
%TEFRAAdvert	% of 5-month advertising budget which is being spent on TEFRA advertising
%TEFRAMark	% of marketing budget used for TEFRA marketing
%TEFRAAdmin	% of administrative budget used for TEFRA administration

Promotion: Impressions

ImpTVAll	# TV impressions, all ages
ImpTV65+	# TV impressions, age 65+
ImpNewsAll	# newspaper impressions, all ages
ImpNews65+	# newspaper impressions, age 65+
ImpDirMail65+	# Direct Mail impressions, age 65+
ImpRadioAll	# radio impressions, all ages
ImpRadio65+	# radio impressions, age 65+
ImpMagAll	# magazine impressions, all ages
ImpMag65+	# magazine impressions, age 65+
ImpBillbdAll	# billboard impressions, all ages
ImpBillbd65+	# billboard impressions, age 65+
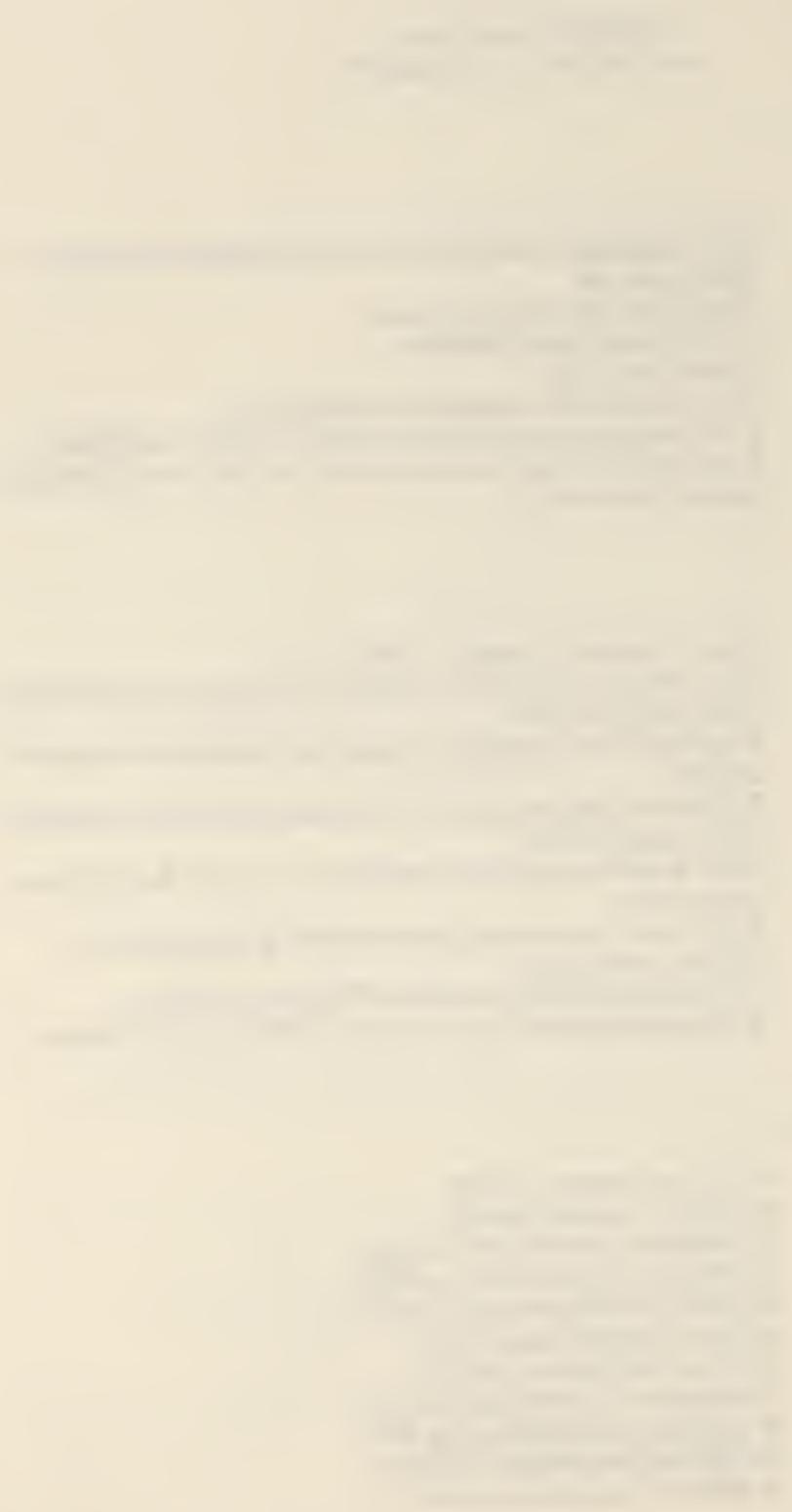
Promotion: Other

CommMtgs	# of community meetings held
HealthFairs	# of health fairs held
CommActivity	HMO sponsors community activities (yes/no)
Educational	HMO sponsors educational activities for seniors (yes/no)
OutsideEmploy	HMO uses "outside" employed marketing reps
OutsideContract	HMO uses "outside" contracted marketing reps
InsideReps	HMO uses "inside" (telemarketing) reps
OutEmpPay	Payment structure for outside employed reps
OutContPay	Payment structure for outside contracted reps
InsidePay	Payment structure for inside reps
NumberDirMail	Average # of Direct Mail pieces sent to each person on mailing list
MtgAttendees	# of people who attended information meetings
HlthFairAttend	# of people who attended health fairs
TypeDirMail	Characterization of people on mailing list
BrochPick	HMO distributes written materials to other places for people to pick up (yes/no)
PromoStratDM	Promotional strategy contains a reliance on Direct Mail
PromoStratTV	Promotional strategy contains a reliance on broadcast media
PromoStratPrint	Promotional strategy contains a reliance on print media
PromoStratMtg	Promotional strategy contains a reliance on community meetings and personal contact

Process of Enrollment

MailApplic	Applications are accepted through mail (yes/no)
HomeRep	Marketing rep will come to potential enrollee's home (yes/no)
PhoneApplic	Potential enrollee can obtain an enrollment application by phone request (yes/no)
NHMarketing	Marketing is done at Nursing Homes (yes/no)
NHAttitude	Plan's attitude toward enrolling Nursing Home residents

Promotion. In the employer (non-Medicare) market, HMO marketing personnel obtain the assistance of employee benefits personnel to distribute promotional materials to potential enrollees. In contrast to the employer market, in most cases HMO marketing personnel must inform individual Medicare beneficiaries about the existence, availability and features of the HMO, and the manner in which this is accomplished could affect the risk selection experienced by the HMO. It is obvious that individuals who are unaware of the availability of an HMO are unlikely to enroll. Not only the total volume of promotion, but the type of promotion may influence which individuals are exposed to the messages.

Therefore, it was necessary to obtain complete and detailed information about the total promotional activities of the study HMOs. These promotional efforts include advertising through mass media, direct marketing such as mailings to potential enrollees, presentations to groups of seniors, sponsorship of activities which seniors attend, distribution of flyers, etc. In addition to collecting data that would allow measurement of the volume of the promotion and characterization of the Medicare beneficiaries who were likely to have been exposed to the promotion, we collected the actual promotional materials used by the HMOs during the study time frame (a three-month enrollment period plus the two months preceding the enrollment period), in order to analyze the messages in the materials. (See Appendix B.)

3.1.5.1. CONTENT ANALYSIS

It was expected that a significant portion of the marketing efforts of HMOs would be promotional messages disseminated through mass media and mailings to seniors. Based on the hypothesis that the specific messages presented would have differential appeal to healthier or sicker individuals, we proposed the use of the formal technique called Content Analysis as a method of analyzing these messages.

The goal of the content analysis was to provide an objective, reliable, and quantitative description of the form and content of the advertising materials used by the participating HMOs. We sought to infer from the analysis who the intended audience for the persuasive appeals might have been, and in particular, whether it appeared as if selected HMOs were orienting their appeals toward healthier-than-average seniors.

A complete description of the technique of content analysis is beyond the scope of this report, and is available elsewhere (Holsti, 1969; Krippendorf, 1980). In general the technique is used to provide a systematic, objective, quantifiable, and meaningful description of media messages. A systematic analysis indicates that the "subjects" of the procedure - the advertisements - will be a representative selection from the population of available advertisements. In this study, all ads used during the 5-month study period (the three-month enrollment period plus the two preceding months) aimed at recruiting and enrolling seniors were studied. To reduce subjective judgments, the coding definitions and categories are required to be objective; final inter- and intra-rater reliability above 80% is expected. Finally, the procedure was required to be quantitative. This was an important requisite since a comparison of media content might otherwise result in two very different

types of ads whose marketing content could not be readily compared. For example, one type of ad might consist of a fairly rapidly-paced television ad containing fleeting images of healthy seniors engaged in physically demanding activities. An overlaid audio track might stress the importance of maintaining health, even as a scroll of various services is presented on the video track. Alternately, a second ad might be slower, easier to follow, might present images of seniors engaged in more moderate pursuits - or even using various health care services. The audio track might stress the importance of enrollment to holding down costs of drugs and medical care, or its importance to rehabilitating or caring for those who are presently ill. While the two types of ads are quite different, and therefore might have a different effect on healthy vs. sick seniors, it is not possible to enter a verbal description into an equation designed to describe or predict selection bias based on health status of enrollees. However, by capturing the content in a quantitative scheme, one is able to describe the degree of visual activity, the degree to which the actors modeled healthy or "ill" behaviors, or the extent to which one ad is different from the other on other important technical dimensions like pace, number of cuts, etc. Thus the results of content analyses may be used in statistical analyses with other quantitative indices.

3.2. DATA COLLECTION

To test the hypotheses stated in Section 3.1., data were required which describe the sample HMOs on dimensions of their organization including model type, size, maturity, and mission, benefit package, premiums, and price. Data were also required about the specific marketing (promotional) efforts of the HMOs, including mass media and individually-oriented promotions. Data were required about the market areas including the penetration rate of HMOs among Medicare beneficiaries, total population, and other health insurance which competes with the HMOs. Lastly, data were required about beneficiaries who chose to join the study HMOs during a defined enrollment period, and beneficiaries who did not choose to join an HMO. These data included demographics, a measure of health status, and other marketing-oriented variables such as the respondents' assessment of the importance (salience) of certain health plan features.

3.2.1. HMO SAMPLE

Overall Sampling Strategy

It was obvious from the outset of this project that that it would not be possible to select a random sample of HMOs to study. The HMOs to be chosen for the study had to have TEFRA contracts and had to be planning to engage in active marketing designed to attract new TEFRA enrollees at some point during the period January through June, 1988. In addition, in order to obtain large enough sample sizes for our measure of risk selection, the HMOs needed to expect to enroll at least 300 new enrollees during a 3-month period or less. Based on communications with leaders in the HMO industry, we knew that many HMOs with TEFRA risk contracts might not be marketing this actively, leading to the expectation that there would be few HMOs from which to choose.

In addition, based on a recommendation from HCFA and in order to be cost-effective, study sites were limited to cities in which two or more HMOs had TEFRA risk contracts. An additional constraint was the need for cooperation from the study HMOs, because the study depended upon obtaining proprietary information on marketing activity, advertising, marketing strategies, enrollment strategies, budgets, etc. However, we also planned to obtain data on some HMOs that refused to participate, because they might differ systematically on the relationship of interest: marketing as it affects risk selection. A final requirement was that the study HMOs had to vary on a number of HMO and market dimensions. Given the limited number of HMOs to be studied, a random sample might not provide the required variation on all of these dimensions.

Thus, a purposive sampling design was selected, based on the three major dimensions of market-area penetration, HMO age, and HMO type. These dimensions are presented in a three-dimensional matrix in Figure 1.

The fact that the chosen HMOs do not constitute a random sample limits the generalizability of results to those cities we selected. However, this is the only sample that could reasonably be obtained and it does have the advantage of permitting the study of the

Figure 1

Characteristics of HMOs and HMO Markets to be Studied
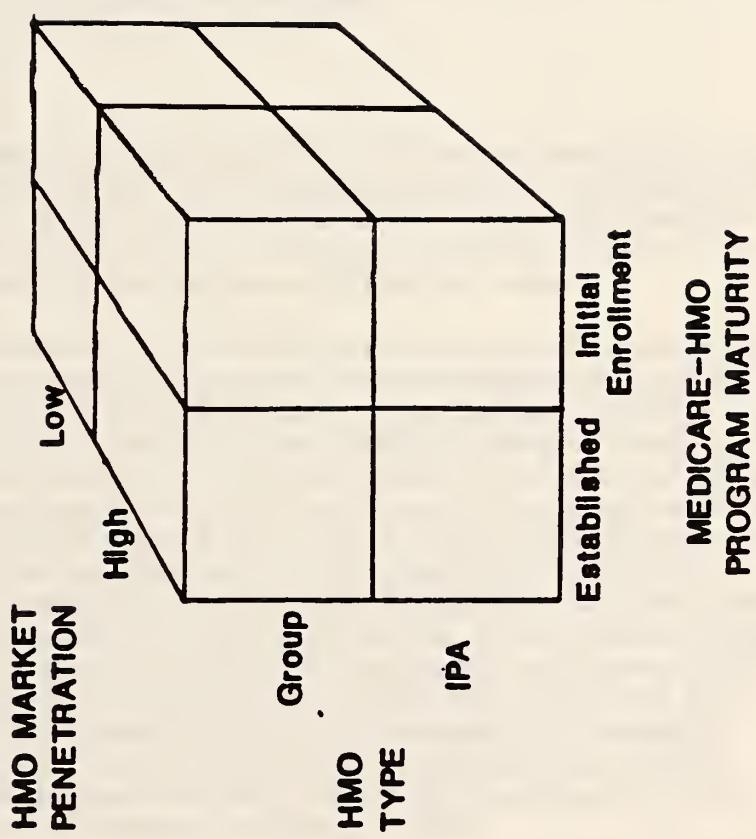
relevant relationships in a cross-section of HMOs that is representative of those HMOs participating in TEFRA. The 22 HMOs ultimately chosen to be in the study had a total number of Medicare enrollees that represented 37% of all TEFRA risk enrollment at the time the study was initiated.

Creation of an Advisory Committee

In order to ensure the participation of a sufficient number of HMOs in the study and in order to learn as much about TEFRA HMOs as we could from people in the field, an Advisory Committee was created for the study. The members of this committee included representatives from several HMO chains and from two industry groups, the Group Health Association of America (GHAA) and the American Medical Care and Review Association (AMCRA). The goals for this Advisory Committee included providing guidance on the practices of risk contract HMOs, and encouraging potential study HMOs to cooperate with the study. The Advisory Committee members from the industry organizations provided information about the study to their member HMOs and recommended that the HMOs cooperate with our efforts.

Selection of Study Sites

The June 1, 1987 Report of Medicare HMO/CMP Contracts identified 154 HMOs with risk contracts, in 89 cities. There were 36 cities which had two or more HMOs with risk contracts (a total of 101 HMOs), as follows: one city with 6 HMOs, 4 cities with 5 HMOs, 2 cities with 4 HMOs, 9 cities with 3 HMOs, and 20 cities with 2 HMOs. There were also 53 cities which had only one HMO with a TEFRA risk contract.

In preparation for contacting the 101 HMOs in cities that had two or more HMOs with TEFRA risk contracts, a standard information sheet was completed for each HMO. Data were obtained from the HCFA monthly report and from publications from InterStudy, GHAA, and AMCRA, including names of officers of the HMO, total enrollment, TEFRA risk enrollment, HMO model, etc. Initial contact with each HMO consisted of sending an introductory letter and a description of the project to each CEO. Telephone contact with the CEOs generally led to referral to the Marketing Directors for specific information about the organizations. The Marketing Directors verified or corrected the information we already had, and provided information about plans for active marketing and other items related to the initial choice criteria. In many cases, the HMOs had made tentative plans for marketing the TEFRA risk program, but there was a great deal of uncertainty about the extent of the promotional effort to be undertaken, and indeed, about the HMO's commitment to TEFRA risk contracting. The Marketing Director also provided the name and title of the individual responsible for deciding whether the HMO would participate in the study, if the HMO was chosen to be in the study. These calls took place in November and December 1987.

After these contacts, HMOs that planned to drop their TEFRA risk contracts at the end of 1987 were eliminated, along with those HMOs which did not plan to actively market their TEFRA risk program and those whose scheduled open enrollment periods did not fit the study protocol (e.g., open enrollment would not occur in the Spring or Summer of 1988). HMOs that planned to actively market but did not expect to enroll 300

or more new enrollees during a 3 month or shorter period were also eliminated. By early January, 1988, a list of 31 proposed study sites in 8 cities had been generated.

After approval by our Project Officer, the decision-makers of the 31 HMOs (usually the CEOs) were contacted to ask them to agree to participate in our study. However, in the short time between obtaining information on these HMOs and contacting the decision-makers, a number of HMOs had modified their plans regarding marketing their TEFRA risk programs. During the same time, other HMOs which were not in the original group of 31 HMOs informed us of their plans to promote their TEFRA risk contracts and to express their interest in the study. After continuing discussions with undecided HMOs, a set of 22 HMOs (in 12 cities) was selected for the study: 20 of the HMOs agreed to cooperate with data collection efforts, and two HMOs were uncooperative. For the two uncooperative HMOs, a secondary data acquisition strategy was used which meant collecting required information through HCFA and state agencies responsible for HMOs. In several cities, only one HMO was studied, although in every study city there were at least two HMOs with TEFRA risk contracts. In the cities where only one HMO was studied, the other HMO(s) either did not plan to actively market during the study time period, or were not willing to cooperate with the study. In one of the 12 cities, the general Medicare beneficiary population and a group with an employer-paid retiree plan were both studied. This city is treated as two separate cities in some of the analyses, and an HMO in this city which enrolled beneficiaries from both the general Medicare beneficiary population and the employer-paid retiree plan is reported as two separate HMOs (yielding 13 cities and 23 HMOs in some analyses). In Table 3, the 22 study HMOs are classifed by HMO market penetration rate, HMO model type, and HMO maturity.

Confidentiality of Information Provided by HMOs

In order to obtain the cooperation of participating HMOs it was necessary to assure HMO executives that the identity of their HMO would remain anonymous and that all data provided to the project would be held in strict confidence.

The need for the protection of the identities of the HMOs and of the confidentiality of the information they provided was discussed with our Project Officer, and it was agreed that no material would be provided to HCFA that identified any of the cooperating HMOs. In our reports, therefore, cities and HMOs are indicated only by a letter and number code to ensure the preservation of the promised protection. Likewise, in all analyses derived from this study, variables have been categorized so as not to reveal data about specific HMOs that may be reported elsewhere (e.g., enrollment figures) and results will only be reported in aggregate form that will not permit the identification of specific HMOs.

Details of the University of Michigan's policies to maintain research confidentiality under the Freedom of Information Act and an example of a Participation Agreement that was used to comply with the Act are contained in Appendix C.

TABLE 3
HMO STUDY SITES
STUDY OF TEFRA RISK HMOs

| | OLD* | | NEW* | | |
	Group/ Staff	IPA	Group/ Staff	IPA	TOTAL
HIGH PENETRATION 5 Cities	4	3	0	3	10
LOW PENETRATION 7 Cities	1	0	5	6	12
TOTAL 12 Cities	5	3	5	9	22

* "Old" HMOs are those which had a Medicare Competition Demonstration plan; "New" HMOs did not have a demonstration plan.

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3.2.2. DATA COLLECTION FROM HMOs

After considering the volume and complexity of data needed from HMOs, a standardized, two-step data collection protocol was devised. The protocol consisted of standard written questionnaires, followed by an in-person site visit to each HMO. Prior to beginning the data collection activity in the field, the data collection method was pretested at a Midwestern HMO which had a TEFRA risk contract but which was not a study site. Input from staff at this HMO took the form of telephone conversations with project staff and a trial site visit at the HMO's offices. HMO staff were very cooperative with our requests for information and assistance, informed us of some of the day-to-day operational issues involved in risk contracting for Medicare, and suggested items to include in our data collection. Based on the pretest, the importance of having a "contact person" at each HMO to facilitate the data collection process was recognized.

After this pretest, HMO data collection instruments were created. Written questionnaires were chosen as an efficient and timely way to collect the large volume of data relevant to the study in a standard format. Two data collection questionnaires were created: the Organizational Questionnaire and the Advertising Questionnaire. The Organizational Questionnaire included questions about the HMO's experience with Medicare beneficiaries, HMO model, number of primary care providers and hospitals, premiums, copayments, benefit packages, identification of decision-makers, enrollment targets for 1988, and sales force. This questionnaire was to be completed by HMO staff and returned prior to our site visit. The Advertising Questionnaire was a log of the advertisements and other promotional materials used by the HMO for the TEFRA program during the five-month study period (the three month enrollment period plus the two preceding months). This questionnaire was to be completed by the HMO during the five-month study period, and returned at the end of this period. These questionnaires are attached as Appendices A and B.

The study design called for the selection of comparison groups of nonenrollees in each study city. Despite HCFA requirements that HMOs market to their entire service areas, it was apparent that HMOs may concentrate their promotional efforts in only a part or parts of their service areas (such as in the areas near group practice sites). Therefore, a criterion for selecting the comparison groups was that the beneficiaries reside in the geographic areas in which the HMOs were marketing. This was defined as the areas in which TEFRA enrollees resided. It was anticipated that such data would most easily be collected from the study HMOs, and that the process of obtaining datasets to be used in drawing enrollee and nonenrollee samples would be lengthy. Therefore, concurrent with the development of the Organizational and Advertising questionnaires and prior to the site visits, data were collected from each cooperating HMO about the service area for the Medicare program.

Subsequent to mailing the Organizational and Advertising questionnaires to the HMOs, site visits were scheduled at each cooperating HMO. For the first several site visits, the site visit team consisted of three members of the project staff, in order that experience could be gained about the structure of the visits and that various combinations of faculty and staff could conduct subsequent visits with acceptable reliability of data

collected. For the remaining HMOs, the site visit teams consisted of two people. The site visits began in mid-February 1988 and continued through early July 1988, although the majority of the site visits were completed by the end of May 1988. Whenever possible, site visit trips were scheduled so that all the study HMOs in a city could be visited in a single trip. Site visitors attempted to meet with each HMO's CEO, the head of marketing or advertising (or both), the person in charge of the day-to-day operations of the Medicare risk program, and a marketing representative who had personal contact with Medicare beneficiaries and who was responsible for enrolling Medicare beneficiaries in the HMO.

Based on information contained in the completed Organizational Questionnaires, a list of topics to be discussed at each site visit was compiled. The list included a set of standard questions, along with specific items tailored to each HMO's organizational structure and particular circumstances. The list also included some questions that it was believed were too "sensitive" to include in a written questionnaire, such as the HMO's overall mission or the reason the HMO chose to have a TEFRA risk contract. A sample list of questions is presented in Appendix D.

Two of the HMOs in the study did not agree to cooperate with data collection efforts, and for these HMOs, a secondary data acquisition strategy was employed. Through site visits to the appropriate HCFA Regional Offices and to the State departments with oversight responsibilities for these HMOs, information was collected about these HMOs. Copies of promotional materials (which must be submitted to HCFA for approval), copies of financial and other reports required by the states, etc. were obtained. Study staff were not able to obtain schedules of advertising or information about activities of marketing representatives for these HMOs. Therefore, the results of the study do not test whether the non-cooperating HMOs differed from cooperating HMOs on these variables.

Both before and after the site visits, there was an occasional need to clarify information or to ask an additional question. These inquiries were directed to the contact person at each HMO. Usually, the contact person was able to answer the inquiry, and if not, was able to direct staff to the appropriate person.

3.2.3. BENEFICIARY SAMPLES

The study design called for obtaining measures of the health status of both Medicare beneficiaries who were recent enrollees in the study HMOs and Medicare beneficiaries who had the opportunity to join the study HMOs but did not choose to do so. Two methods were identified through which recent enrollees could be identified: from the HMOs directly, or from HCFA's Medicare datasets. It was decided to obtain identification of the enrollees directly from the HMOs. For the nonenrollees, two potential data sources were identified: datasets from the Medicare fiscal intermediaries, or HCFA Medicare datasets. With HMOs in twelve market areas, it was recognized that work with twelve different intermediaries would be required; therefore HCFA datasets were chosen as the best source of data for identifying the non-enrollee sample.
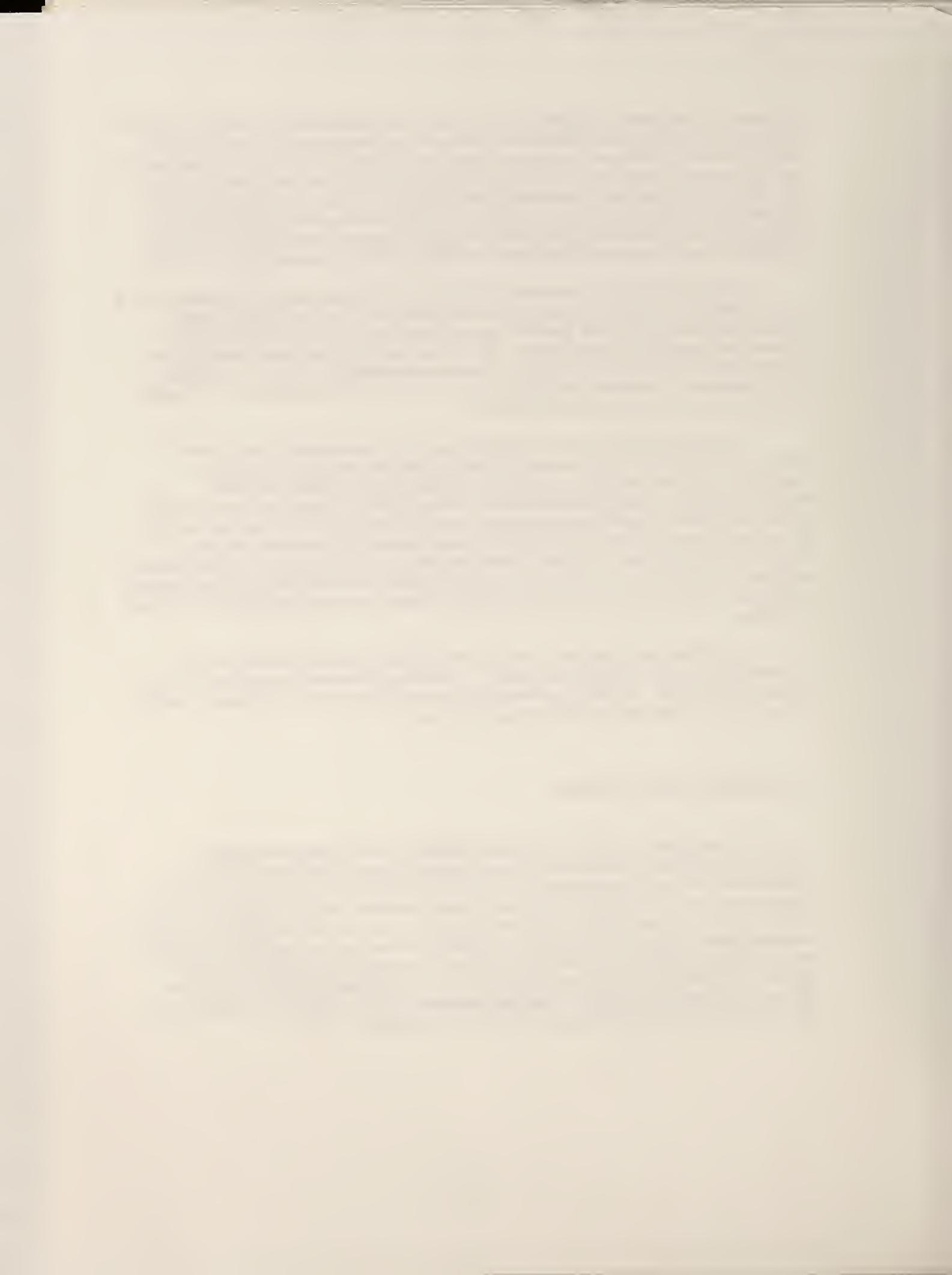
It was apparent that most HMOs, while willing to provide names and other identifying data about new enrollees, were unable or unwilling to provide mailing addresses and phone numbers for these individuals. Our Project Officer suggested that HCFA's UHHIMRS tapes were an appropriate source for these data. It was also determined that this dataset would be appropriate for identification of the non-enrollee sample.

Preparation of Datasets

Several preliminary steps were required in order to obtain HCFA datasets which would contain records of beneficiaries in the 12 market areas. Based upon information provided by HMO staff, project staff compiled a list of three-digit zip codes in which the Medicare beneficiaries of interest resided. HCFA staff then provided UHHIMRS tapes which contained names, addresses, Medicare eligibility, and HMO enrollment data for all Medicare beneficiaries as of December 31, 1987, in the geographic areas of interest. Prior to drawing samples of beneficiaries to survey, sets of counties were identified which would accurately define the 12 service areas, relevant data elements from the data tapes were chosen, and a reduced data set was created, which was the basis for both the enrollee and nonenrollee samples.

Staff at each of the cooperating HMOs provided lists of those Medicare beneficiaries who enrolled in the HMO during the three-month enrollment period. The lists contained at a minimum the name, Health Insurance Claim (HIC) number, and birthdate of each enrollee. Enrollees were matched against the reduced data set, the enrollment status field was updated for individuals who had enrolled subsequent to December 31, 1987, and a file of "matched" enrollees was created for each HMO. If there were more than 300 "matched" enrollees for an HMO, a random sample of 300 enrollees was drawn to survey. If there were 300 or fewer enrollees whose HIC numbers matched the reduced HCFA data set, every enrollee was retained in the sample.

For the two uncooperative HMOs, our Project Officer assisted us in obtaining enrollment information from HCFA. HCFA provided a data tape identifying every new enrollee for the first six months of 1988, and the effective date of enrollment. This enrollment information was used to update the enrollment status field in the "reduced data set." We then created a "matched" data set containing the enrollees residing in the designated service area whose enrollment dates corresponded to the three month enrollment periods for the uncooperative HMOs. A random sample of 300 enrollees was drawn for each of these HMOs.

Nonenrollee Samples

Nonenrollee samples of 300 individuals were selected for each of the 12 study cities. The nonenrollee samples were drawn from records in the reduced data sets, which were limited to the counties designated as defining the service area. The enrollment status field in the reduced data set contained enrollment information for all Medicare beneficiaries through December 31, 1987, updated with enrollment information for all beneficiaries who enrolled in the study HMOs during the enrollment periods.
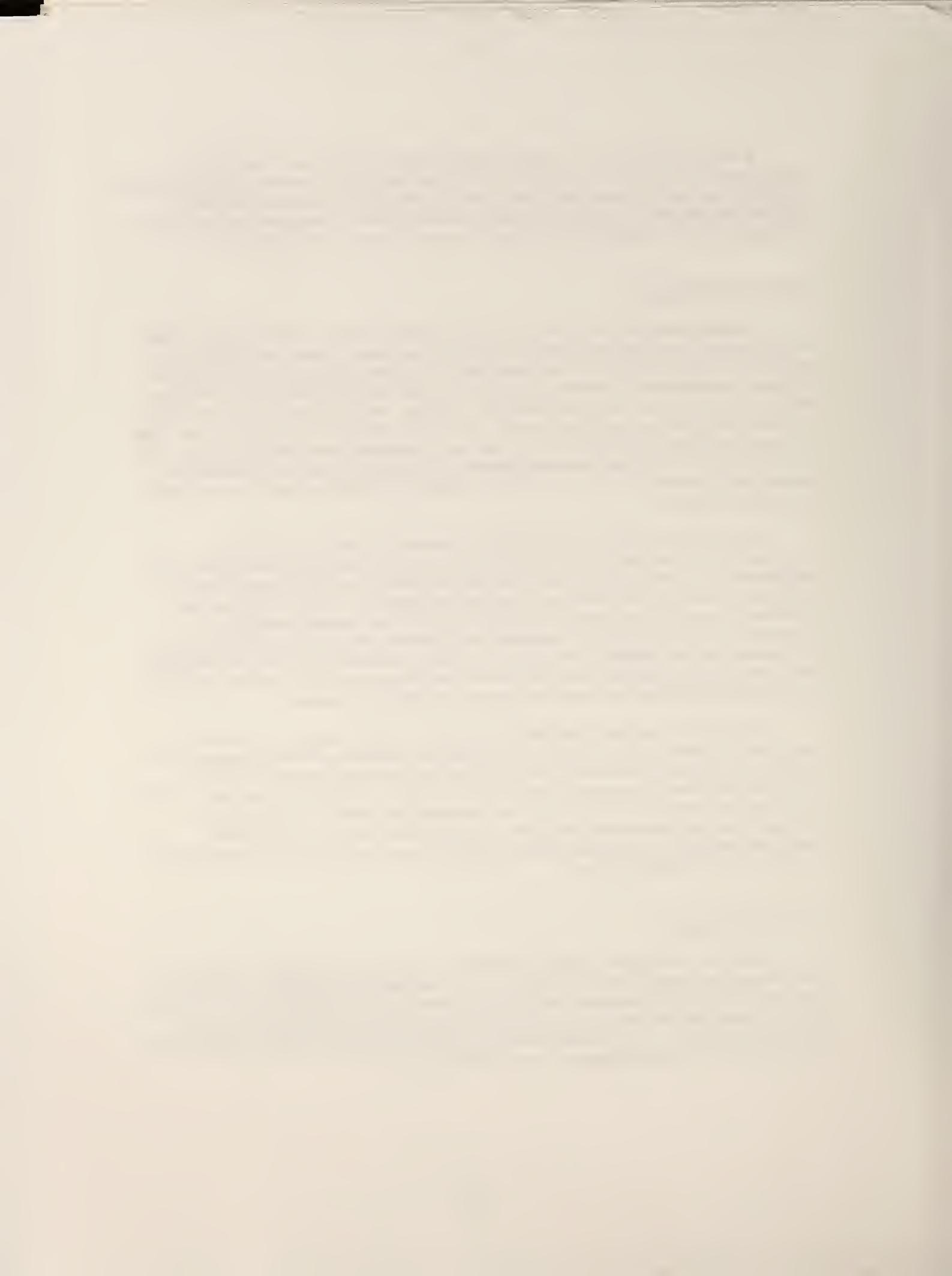
It is possible that some beneficiaries who we believed to be nonenrollees enrolled in non-study HMOs in the market areas, or enrolled in study HMOs prior to the beginning of the enrollment period. Some individuals, therefore, may be identified as "nonenrollees" when they were in fact enrollees. We believed that the degree to which this occurred could be tested (post survey) since a question about health insurance was included on the beneficiary questionnaire. Among responding nonenrollees, 11% identified an HMO or Prepaid Group Practice for their source of health insurance. However, since we cannot be certain as to the basis for these responses (fee-for-service use of HMOs, presence of a wrap-around indemnity policy from an HMO, TEFRA enrollment, etc.) these respondents were not eliminated from the analyses. However, this limitation of the data should be noted.

Each beneficiary in the enrollee and nonenrollee sample files was assigned a seven digit "respondent number." Database files using dBase III were created, which contained respondent number, name, address, birthyear, and sex. These database files were used to conduct the field portion of the survey for both enrollee and nonenrollee samples. Further details on the use of these database files and specific survey procedures are presented in Appendix E, ISR and Field Operations.
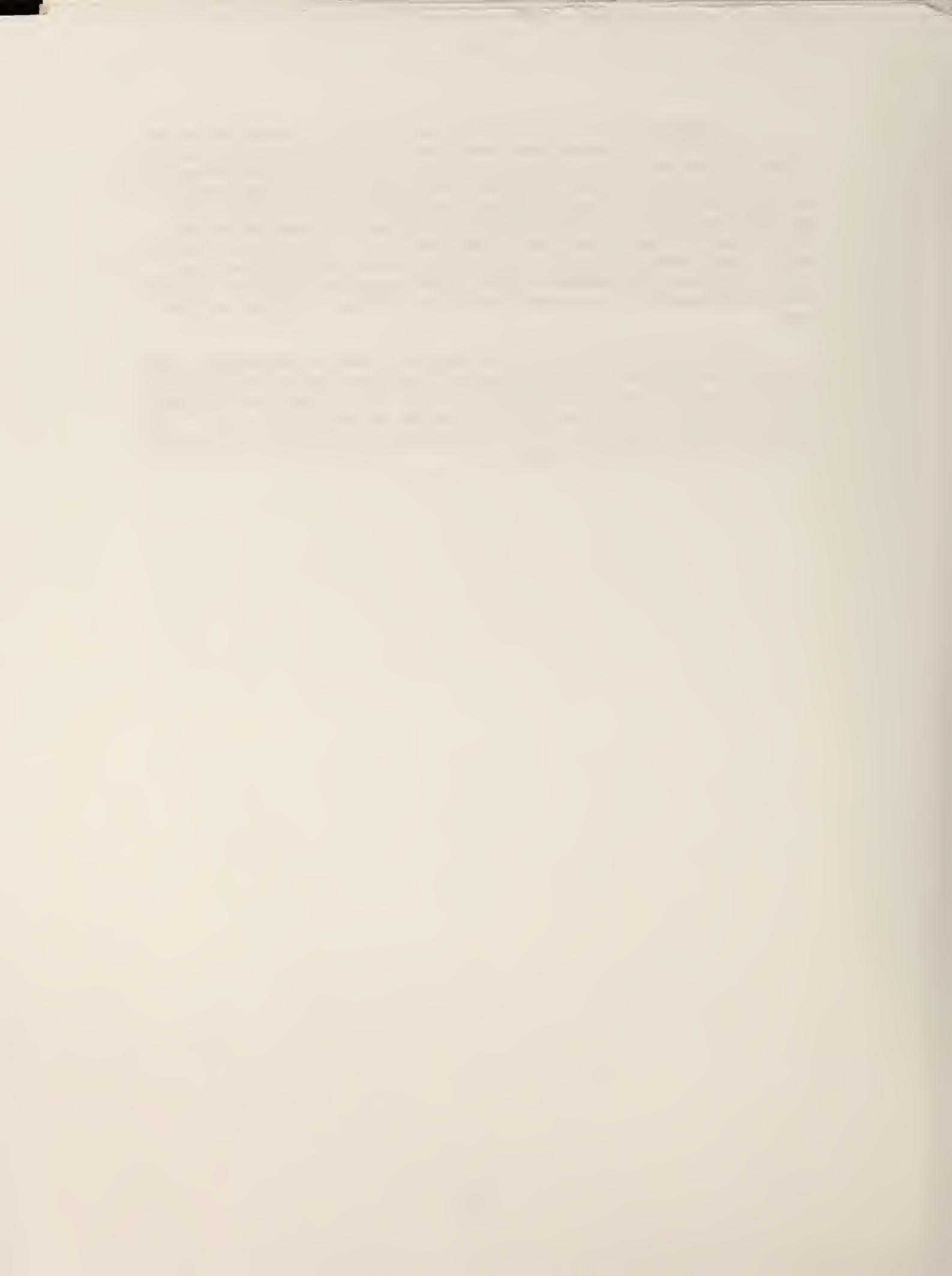
3.2.4. DATA COLLECTION FROM BENEFICIARIES

Data collection from the beneficiary samples was accomplished through a mailed questionnaire. Individuals in the enrollee and nonenrollee samples were sent a survey instrument which consisted of four sections: health status items, questions about the salience (importance) of specific features of health care delivery or insurance programs, questions about beneficiaries' beliefs about the availability of these features at (named) HMOs in their city, and demographics items. Each of these four sections is discussed separately below. The presentation of the survey instrument, fielding of the survey, and the procedures used to obtain missing data are also described below.

Health Status

Initial plans called for the use of a set of 17 questions designed to measure functional and perceived health status (Table 4). These questions were drawn from the Physical Capacities Index and the Functional Limitations Battery used by the Rand Corporation in the Health Insurance Experiment (Stewart et al., 1981; Stewart et al., 1982), and have been well-validated in Rand's research. However, because Rand's research excluded respondents over the age of 65, the utility of these questions for a largely-elderly population needed to be tested. Therefore, this set of 17 items from Rand's research was pretested on groups of volunteer seniors.

A total of 236 seniors completed pretest questionnaires which contained the complete initial set of health status questions. The responses were analyzed, and it was determined that most of the questions fit well in a Guttman scale. Modifications to the set of questions, to improve the scaling results, included dropping one confusing item ("walking with a cane," problematic because of its confusing wording and because it appeared to measure mobility rather than functional abilities). In addition, items that scaled similarly were combined. Thus, "eat without help," "dress without help," and "use the bathroom without help" were combined into one level; "walk to a table for meals" and "walk around inside the house without help" were combined into one level; "moderate work at home" and "walk a block or more without help" were combined into one level; "run a short distance" and "walk uphill or up stairs without help" were combined into one level; and "participate in active sports" and "hard activities at home" were combined into one level. A similar methodology was used by the Rand Corporation in creating the Guttman scale for their health status items in the Health Insurance Experiment (Stewart, et al., 1982).

In evaluating the scalability of the health status questions, the two traditional measures of Guttman Scale properties were used: the Coefficient of Reproducibility (CR) and the Coefficient of Scalability (CS). The Coefficient of Reproducibility measures the extent to which a respondent's scale score (the number of positive responses) is a predictor of one's response pattern. A high CR indicates reliability and reproducibility of the scale, and CR values of .90 or greater were accepted as evidence of this (Nie, et al., 1975; Edwards, 1957; Guttman, 1944). The Coefficient of Scalability indicates the proportion of possible improvement that was achieved by the observed CR (over the minimum CR that would be obtained from the distribution of the item scores). As evidence of the scalability of the items, CS values of .60 or greater were accepted (Stewart et al., 1978; Nie, et al., 1975).
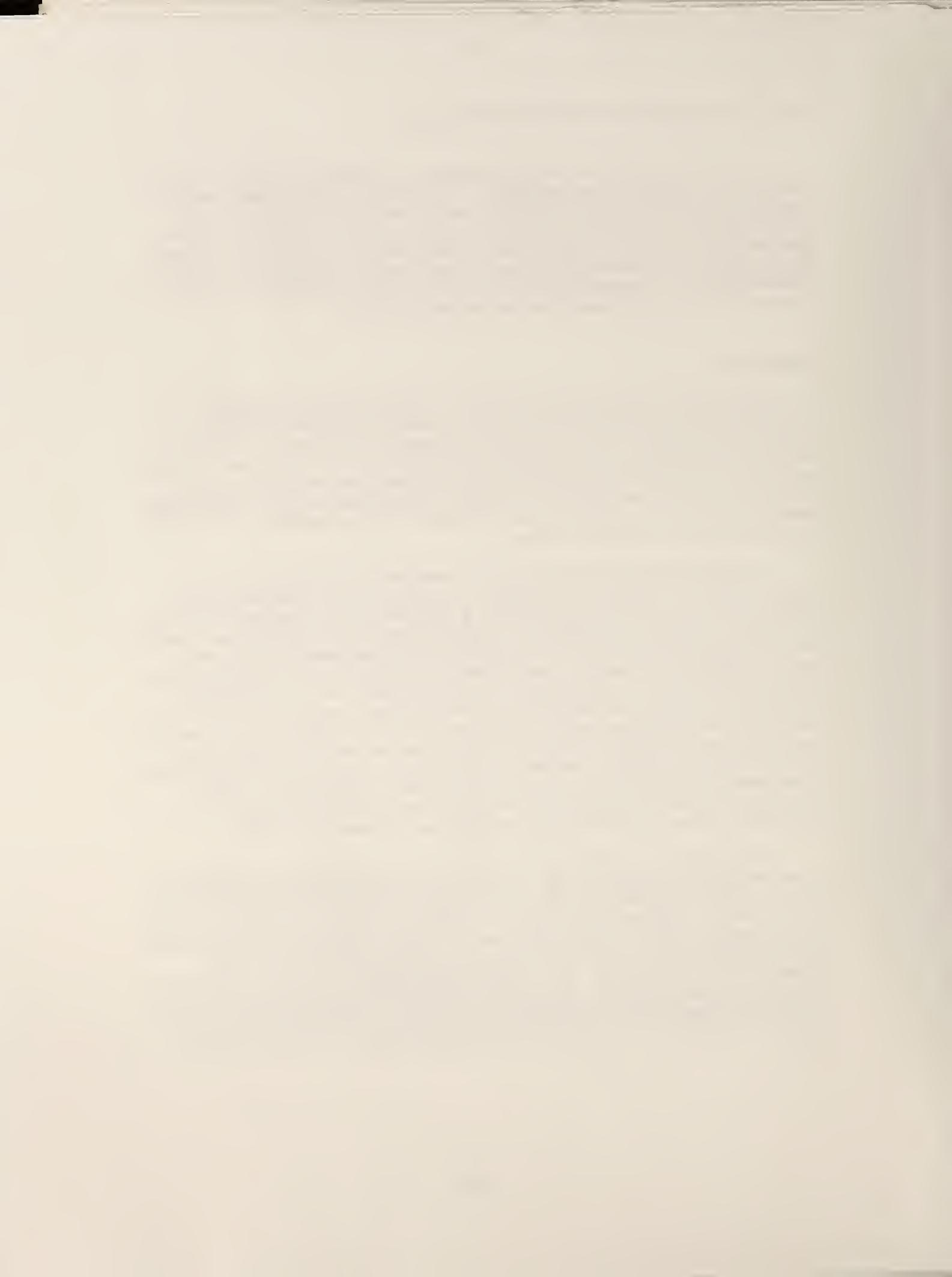
TABLE 4
ORIGINAL SET OF HEALTH STATUS QUESTIONS

1. Can you eat without help?

2. Can you dress yourself without help?

3. Can you use the bathroom without help?

4. Can you walk to a table for meals without help?

5. Can you walk around inside the house without help?

6. Can you do light work around the house like dusting or washing dishes?

7. Are you in bed or a chair for most or all of the day because of your health?

8. Do you have to stay indoors most or all of the day, because of your health?

9. Are you unable to walk unless you are assisted by another person or by a cane, crutches, artificial limbs or braces?

10. When you travel around your community, does someone have to assist you because of your health?

11. Could you do moderate work at home like moving a chair or table, or pushing a vacuum cleaner?

12. Can you walk a block or more without help?

13. Does your health limit you in any way from doing anything you want to do?

14. If you wanted to, could you run a short distance?

15. Can you walk uphill or up stairs without help?

16. If you wanted to, could you participate in active sports such as swimming, tennis, and volleyball?

17. Can you do hard activities at home, heavy work like scrubbing floors, or lifting or moving heavy furniture?
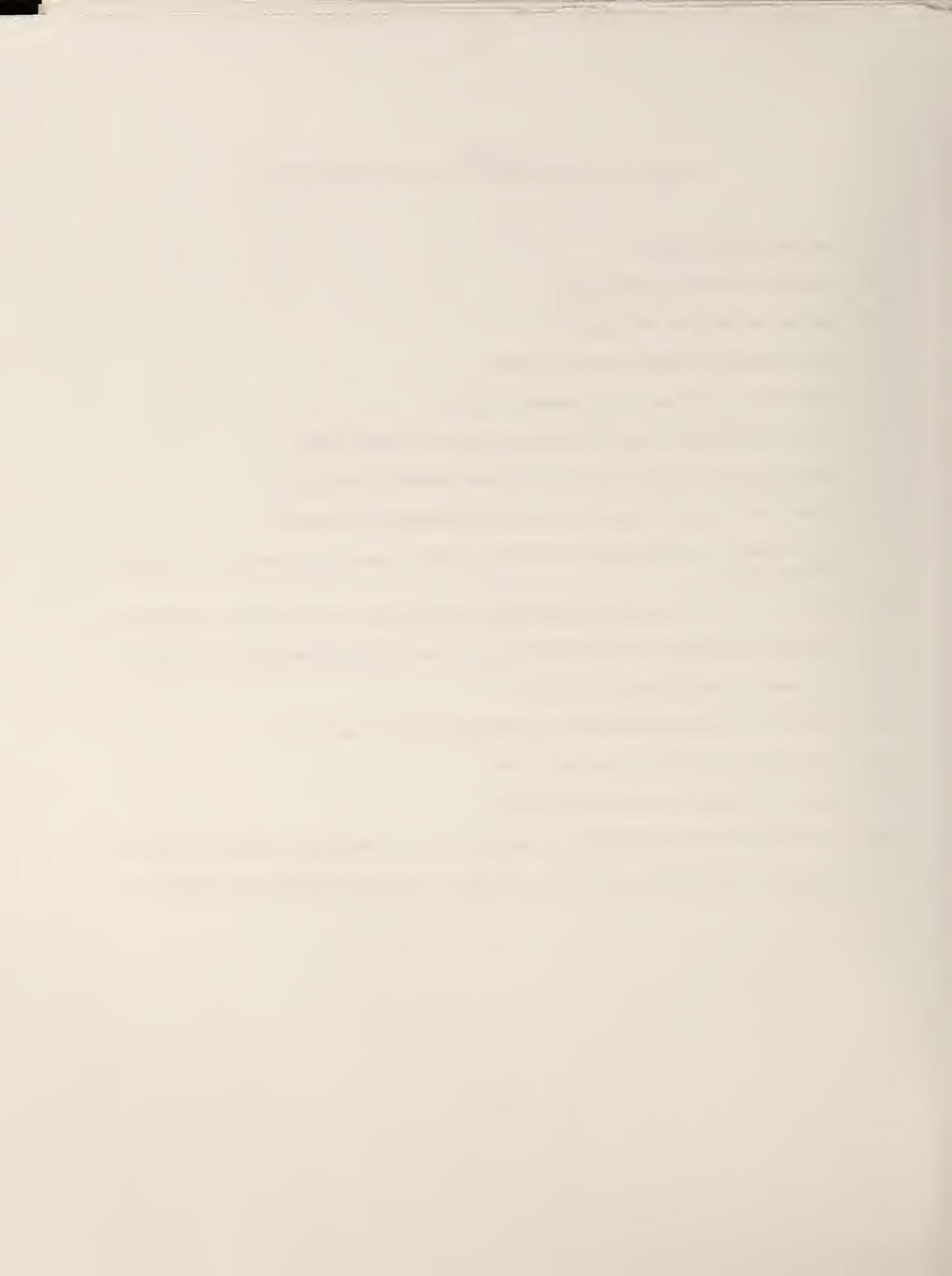
After combining items which appeared to scale similarly, it was found that the CR was 0.9490 and the CS was 0.7313, indicating strong Guttman scale properties.

Two items in the question set which scaled identically to other items were eliminated, in order to reduce respondent burden. Several additional functional health status questions which had been used in a previous study of Medicare beneficiaries (Thomas and Lichtenstein, 1986) were also added. Based on responses from the previous study, it was expected that these items would scale between items in the original question set, and would provide finer distinctions in the health status measures. Table 5 provides details on the dropped items and added items. Table 6 shows the final scale of 16 health status items.

Salience and Beliefs

A major focus in developing the beneficiary survey instruments was the inclusion of a set of traditional market survey items that consisted of two parts: Salience (importance) and Beliefs. These items were included to allow measurement of the relative importance of various elements of the marketing mix to respondents and measurement of respondent knowledge about HMO benefits. It was expected that these measures could be used to empirically weight variable elements of the marketing mix. These measures could also be used to examine the relationship between health status and the degree of importance of various elements of marketing, to determine the extent to which various elements of the marketing mix contribute to risk selection.

A broad range of health care features, which might be important to Medicare beneficiaries, was identified through reviewing literature about the elderly, the Medicare program and TEFRA HMOs, and by noting the types of features that are commonly promoted by HMOs with risk contracts. Salience pretests were conducted with small groups of elderly in the Ann Arbor area, in which different sets of features and different question formats were used. While conducting the pretests, items rated very unimportant were dropped, and features which the volunteers had suggested were important were incorporated. Wordings were revised to more clearly focus on specific elements of medical care, and to incorporate terminology familiar to seniors. Formats for the salience questions were also tested. (For example, it was found in early pretests that elderly respondents had difficulty in answering questions which require consideration of a hypothetical situation, which led to revisions in the way the questions were asked.) Answer categories were revised to better allow respondents the ability to distinguish between degrees of importance (by designating the highest-importance category "Absolutely Necessary," much greater variation in responses was obtained than when the highest-importance category was "Extremely Important"). A question about having a private room in the hospital was also included, in order to reduce the "consistency effect" which might occur if only highly desirable attributes of health care were included. The assistance received from researchers at the Institute for Social Research (ISR) at the University of Michigan was invaluable in this effort.

Based on the results of over 80 pretest responses, health care features to be included in the survey instruments were chosen. An additional feature, the stability of the source of care, was identified based on the site visits. Although it was not included in the pretests, this feature was deemed quite important by HMO staff, and since it could be crucial in influencing Medicare beneficiaries in their choice of health insurance, it was included in the survey instrument. The final set of features is listed in Table 7.
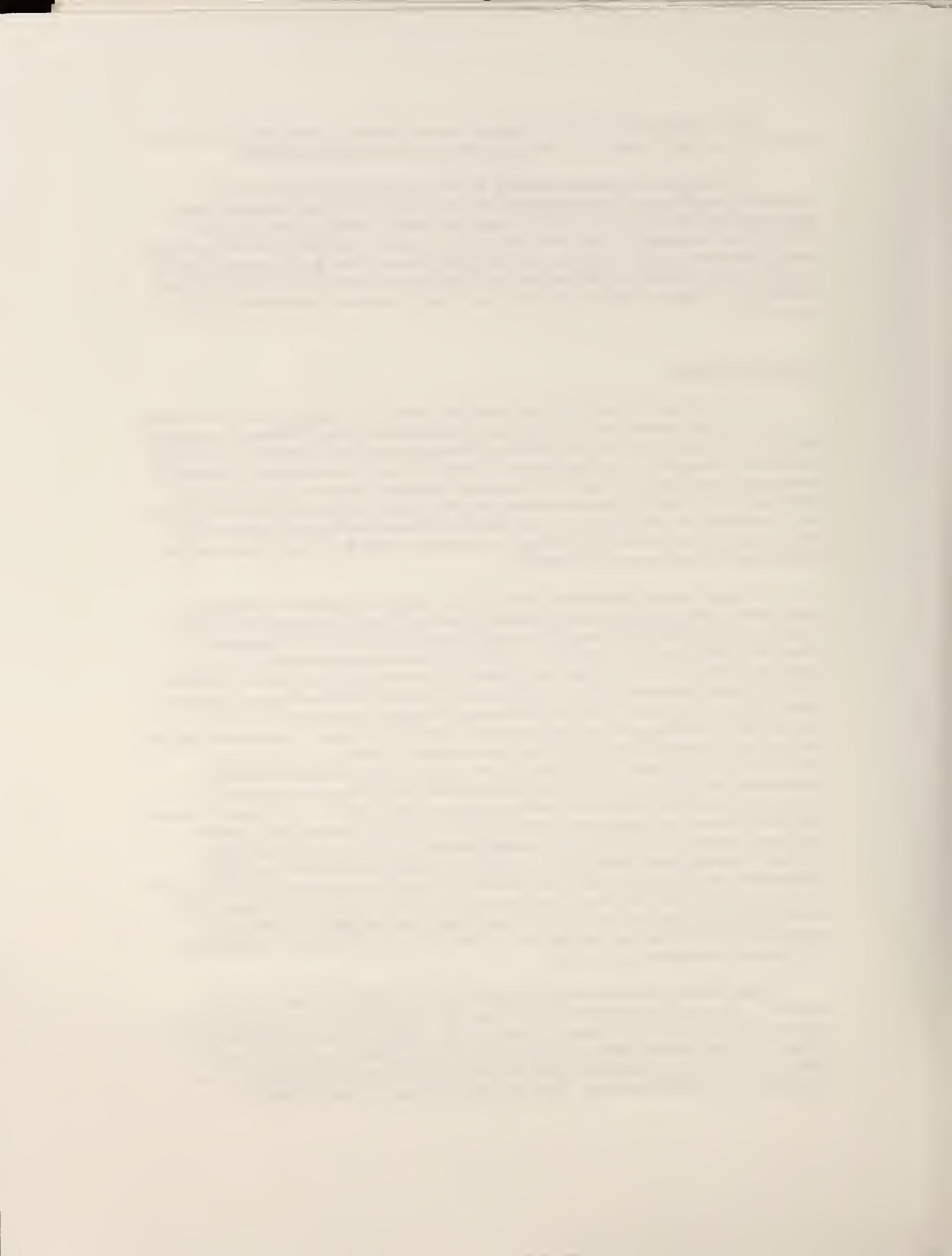
TABLE 5

MODIFICATIONS TO SET OF HEALTH STATUS QUESTIONS

<u>ADL/IADL Items</u>	<u>Rand Corp. Items</u>	
	Can you eat without help?	100.0%
	Can you dress yourself without help?	YES on
	Can you use the bathroom without help?	all 3
	(drop "bathroom" item)	
	Can you walk to a table for meals?	98.0%
	Can you walk around inside the house	YES on
	without help?	BOTH
	(drop "walk inside house" item)	
Can you go to the bathroom and use the toilet without help? *(add this item)*	97.2% YES	
	Can you *do* light work around the house like dusting or washing dishes?	96.6% YES
Can you take a bath or shower without help? *(add this item)*	90.5% YES	
	Are you in a bed or a chair for most or all of the day because of your health?	86.8% NO
	Do you have to stay indoors most or all of the day, because of your health?	84.8% NO
	When you travel around your community, does someone have to assist you because of your health?	77.9% NO
	Could you do moderate work at home like moving a chair or table, or pushing a vacuum cleaner?	76.0% YES on
	Can you walk a block or more without help?	both
	Does your health limit you in any way from doing anything you want to do?	51.5% NO
	If you wanted to, could you run a short distance?	39.2% YES
	Can you walk uphill or up stairs without help?	on both
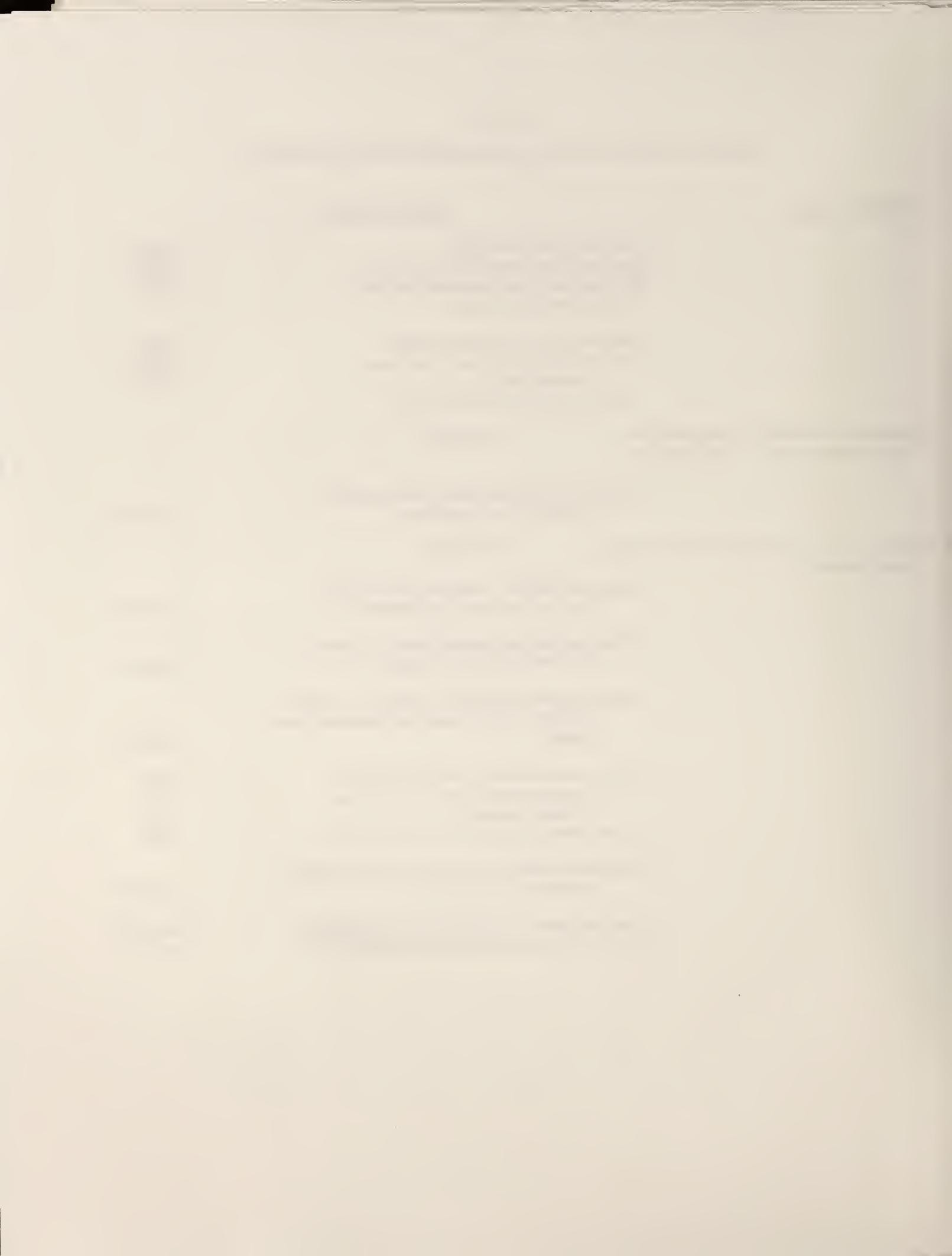
TABLE 5, continued

MODIFICATIONS TO SET OF HEALTH STATUS QUESTIONS

ADL/IADL Items   Rand Corp. Items

        If you wanted to, could you participate in active sports
                such as swimming, tennis, and volleyball?   21.1%
        Can you do hard activities at home, heavy work   YES
                like scrubbing floors, or lifting and   on
                moving heavy furniture?   both

---

* ADL items are from Katz, IADL items are from Rosow-Breslau

TABLE 6

FINAL SET OF FUNCTIONAL HEALTH STATUS QUESTIONS

1. Can you eat without help?

2. Can you dress yourself without help?

3. Can you walk to a table for meals?

4. Can you go to the bathroom and use the toilet without help?

5. Can you do light work around the house like dusting or washing dishes?

6. Can you take a bath or shower without help?

7. Are you in a bed or a chair for most or all of the day because of your health?

8. Do you have to stay indoors most or all of the day, because of your health?

9. When you travel around your community, does someone have to assist you because of your health?

10. Could you do moderate work at home like moving a chair or table, or pushing a vacuum cleaner?

11. Can you walk a block or more without help?

12. Does your health limit you in any way from doing anything you want to do?

13. If you wanted to, could you run a short distance?

14. Can you walk uphill or up stairs without help?

15. If you wanted to, could you participate in active sports such as swimming, tennis, and volleyball?

16. Can you do hard activities at home, heavy work like scrubbing floors, or lifting and moving heavy furniture?

TABLE 7

HEALTH CARE FEATURES INCLUDED IN BENEFICIARY SURVEY

1. Having your doctors in a location that is convenient to you.

2. Having your insurance cover the cost of a private room in the hospital. **

3. Having most of your doctor and hospital bills paid for by your insurance (small copayments or deductibles).

4. Having your insurance cover most of the cost of prescription drugs and medicine.

5. Having pleasant and courteous staff where you get your health care.

6. Being able to be seen by a specialist, such as a cardiologist, within 2 weeks, if you are referred by your regular doctor.

7. Having little or no paperwork or bills to send in when you receive medical care.

8. Having your insurance cover unlimited days of hospital care (Medicare only covers 150 days).

9. Having your insurance cover the costs of all routine physical examinations and immunizations (such as flu shots).

10. Having your insurance cover all care provided in a skilled nursing facility (Medicare only covers 100 days of this care).

11. Knowing that the insurance plan you join will be stable and will continue to provide coverage in the coming years.

12. Being able to go to any doctor you choose, rather than only those on an approved list.

13. Being able to go to any hospital you choose, rather than only those on an approved list.

** Private Room question was included in Salience section, but not in Beliefs section of the Beneficiary Survey instrument.

"Beliefs" questions, designed to allow measurement of beneficiary knowledge of the features of HMOs in their market area, were also formulated and tested. It was hypothesized that the results of these questions would allow us to summarize, for each HMO, how well their enrollees and nonenrollees understand the features of the HMO, especially along the healthy - unhealthy continuum. It was also expected that such items could be used in constructing a model of the relationship between marketing activity and risk selection.

Different wordings of the Beliefs questions, alternative question formats, and different versions of instructions were pretested. In addition, ways to reduce the number of unanswered items (including experimenting with skip patterns, which was unsuccessful with this mainly elderly population) were tested.

Demographics

A literature search was undertaken to identify demographic indicators which have been shown to relate to HMO membership and to identify variables which had been used in past research with the Medicare population. For some variables, validated question wordings were identified in the literature. Researchers at ISR who specialize in survey techniques for the elderly also assisted in developing several new items, and in adapting other items for use with elderly respondents.

Pretesting of the demographics items was conducted concurrently with pretests of other sections of the questionnaire. Based on the results of pretests, preferred wordings for items were identified, and some items were eliminated.

Throughout the pretests of demographics items, questions and response categories were revised when respondents indicated difficulty in answering. The demographics items were tested with enrollees of the Midwestern TEFRA HMO which was the pretest site, and with residents of two senior apartment complexes, a majority of whom were nonenrollees. Results of the pretests confirmed that the questions were written appropriately, and that the responses were valid and reliable.

Conduct of the Beneficiary Survey

The task of conducting the dual mode survey (mailed surveys with telephone follow-up for missing data) of over 10,000 Medicare beneficiaries was subcontracted to the Survey Research Center (SRC) at the Institute for Social Research (ISR) of the University of Michigan. SRC-ISR is a nationally-known center for survey research, with the expertise to efficiently conduct the field portion of this project. Among the services provided by SRC-ISR were: assistance in planning the survey activity, creation of control software, technical advice, mailing of survey instruments, and logging and data input for returned survey instruments.

After pretesting the beneficiary survey instrument, SRC-ISR staff assisted project staff in finalizing the format of the questionnaire so that it could be easily handled by the senior population. Included in the format dimensions that were explored were: type
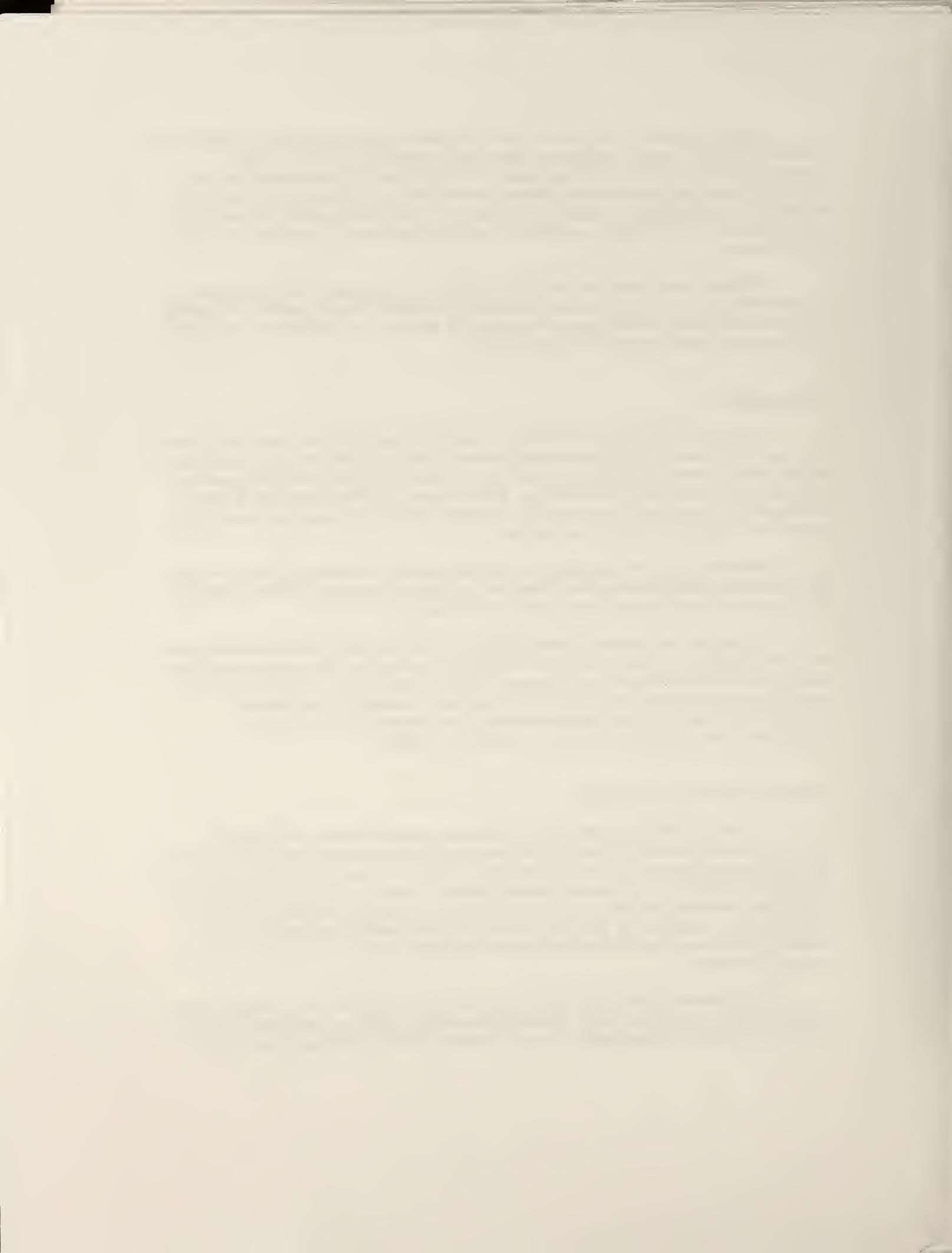
size and style, the size of the questionnaire booklet, page layout, etc. Based on ISR suggestions, the survey instrument was named "Health Study of American Seniors." ISR staff suggested that an uncomplicated name for the survey, which is relevant to the questions in the survey, would encourage a higher response rate and less confusion on the part of respondents. This name has not been used anywhere else in referring to the study. ISR assistance was also invaluable in finalizing the wording of the cover letters to be sent to the survey sample, particularly relating to issues of confidentiality and the use of respondent numbers on the questionnaire booklets.

Steps in fielding of the beneficiary survey included an initial questionnaire with cover letter and stamped return envelope, followed by a reminder postcard to each person in the sample. Several weeks after the postcard, a reminder letter was sent to nonrespondents, and several weeks after the reminder letter, a second questionnaire with cover letter and stamped return envelope was sent to those who had still not responded. For responses which were received and deemed to fit the criteria for a missing data callback (described below), a telephone call was made to the respondent. Specific details of the activities undertaken in fielding the beneficiary survey are included in Appendix E, ISR and Field Operations.

Response Rates

Questionnaires were sent to a total of 10,035 Medicare beneficiaries. Overall, 6,887 beneficiaries returned questionnaires with at least one question answered, yielding an overall gross response rate of 68.6%. Response rates were also computed for each enrollee and nonenrollee group surveyed. In general, the response rates for enrollee groups were higher than those of nonenrollee groups. The gross response rate for enrollees in all cities (total questionnaires with at least one question answered / total sample size) was 75.6%. By HMO, this rate varied from 59.7% to 91.1%. The gross response rate for nonenrollees in all cities was 58.0% and this varied by city from 48.9% to 75.4%.

After adjusting the sample sizes for deaths, individuals who moved out of the area, or those with "bad addresses," the response rate for all beneficiaries was 71.0%. The response rate for enrollees averaged 77.0% (and ranged by HMO from 62.3% to 91.4%). The response rate for nonenrollees averaged 61.4% (and ranged by city from 51.9% to 77.4%). Gross and adjusted response rates for each enrollee and nonenrollee group are shown in Table 8.

Criteria for Missing Data

One of ISR's responsibilities in fielding the survey was to follow-up, by telephone, those cases where respondents returned questionnaires with missing data. In order to limit the contacts with beneficiaries, and the cost of follow-ups, project staff carefully chose those data items for which we believed responses were necessary for the research. Because the dependent variable in this study is health status, considerable effort was devoted to specification of the criteria for missing data follow-ups when health status questions were not answered. For the Salience questions, missing data follow-ups were required when two or more items were unanswered, and for the Beliefs questions, follow-ups were required when four or more items were unanswered. In the Demographics section of the survey

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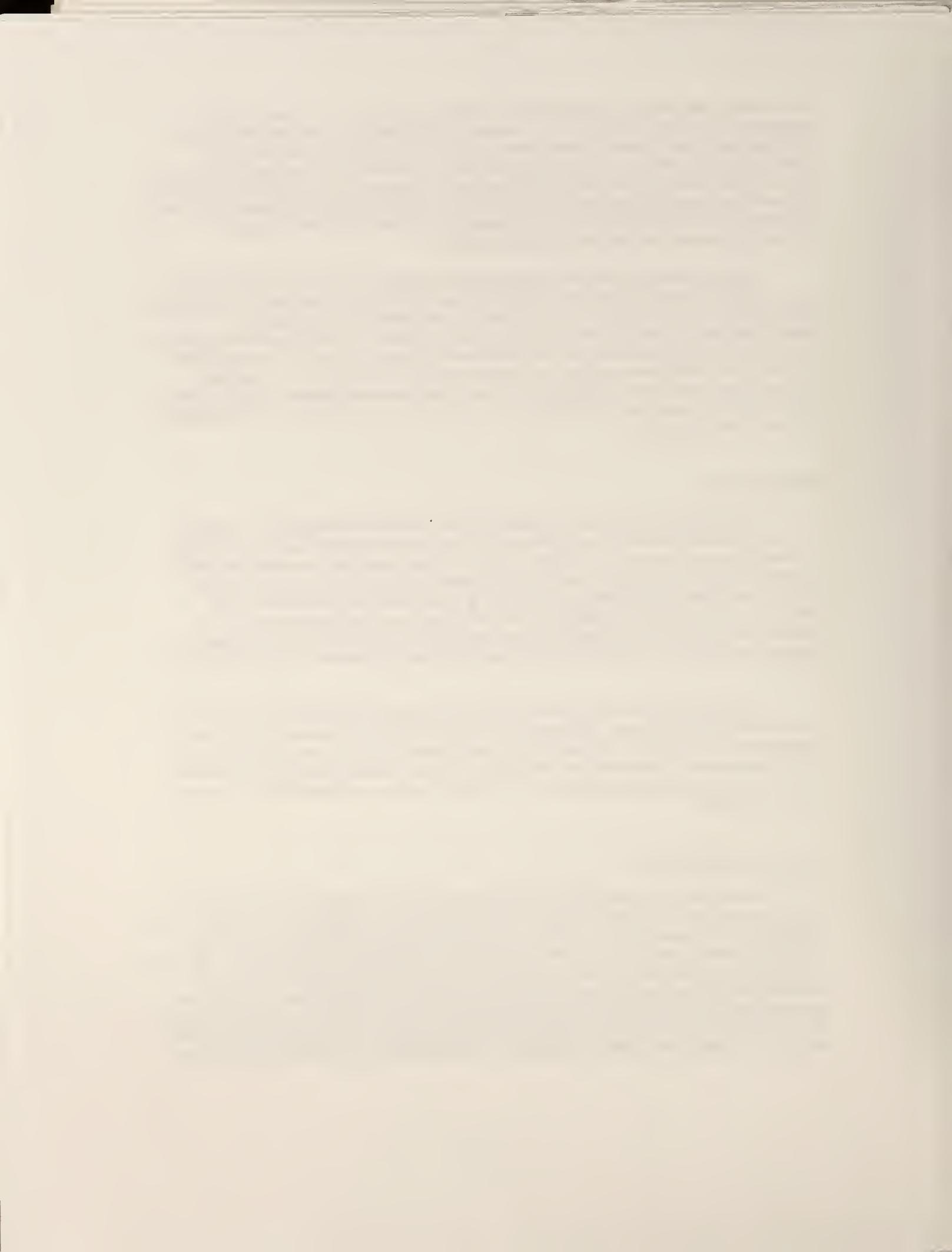
TABLE 8
GROSS AND ADJUSTED RESPONSE RATES

ENROLLEES:

HMO #	Gross Sample Size	Adjusted Sample Size	Total Responses	Gross Response Rate	Adjusted Response Rate
11	305	293	212	69.5	72.4
12	305	297	205	67.2	69.0
13	305	301	230	75.4	76.4
14	400	396	298	74.5	75.3
15	305	300	233	76.4	77.7
16	305	299	245	80.3	81.9
22	305	300	221	72.5	73.7
23	305	292	182	59.7	62.3
24	305	302	229	75.1	75.8
25	257	256	221	86.0	86.3
26	85	85	66	77.6	77.6
27	305	297	208	68.2	70.0
33	189	183	161	85.2	88.0
34	170	168	124	72.9	73.8
35	305	295	228	74.8	77.3
36	34	33	28	82.4	84.8
44	305	299	243	79.7	81.3
45	305	304	278	91.1	91.4
46	55	55	39	70.9	70.9
47	305	300	233	76.4	77.7
48	305	301	234	76.7	77.7
49	305	298	224	73.4	75.2
50	305	301	245	80.3	81.4

NONENROLLEES:

City #	Gross Sample Size	Adjusted Sample Size	Total Responses	Gross Response Rate	Adjusted Response Rate
11	305	288	173	56.7	60.1
12	305	283	187	61.3	66.1
13	305	295	168	55.1	56.9
14	305	289	162	53.1	56.1
15	305	297	230	75.4	77.4
16	305	289	177	58.0	61.2
17	305	291	184	60.3	63.2
18	305	288	174	57.0	60.4
19	305	281	160	52.5	56.9
20	305	286	170	55.7	59.4
21	305	286	193	63.3	67.5
22	305	287	149	48.9	51.9
23	305	285	173	56.7	60.7

instrument, follow-ups were not to be made when data were missing for age, household size or household income questions. If two or more of the remaining items were unanswered, a follow-up call was to be made.

Of the total of 6,887 responses to the survey instrument, 1,890 (27.4% of the responses) met the criteria for missing data callbacks. ISR telephone interviewers were able to complete missing data telephone calls with 1,370 respondents (72.5% of those which met the missing data criteria). Telephone interviewers were unable to conduct missing data telephone calls with 520 respondents: in most of these cases, project staff and ISR telephone staff were unable to obtain telephone numbers for the respondents.

A detailed description of the procedure for conducting follow-up telephone calls for missing data is provided in Appendix E, ISR and Field Operations.

Follow-Up Study of Nonrespondents

ISR telephone interviewers conducted a nonrespondent survey in the Winter of 1989. This nonrespondent survey was conducted to obtain health status data for a sample of individuals who had not responded to the beneficiary questionnaire, in order that a determination could be made about non-response bias in the dependent variable, differences in health status between enrollees and nonenrollees. If the health status differences between enrollees and nonenrollees in the nonrespondents were not significantly different from the health status differences between respondent enrollees and nonenrollees, a conclusion could be drawn that non-response did not lead to bias in the dependent variable. This was of particular concern because the response rate to the beneficiary survey was higher for enrollees than for nonenrollees. It also appeared, before doing any stringent analysis, that the enrollees were younger, in general, than nonenrollees. Therefore, a telephone survey of a sample of the nonrespondents was conducted.

Items in this nonrespondent follow-up survey included the health status questions from the mailed survey instrument, along with a question about regular source of care. The items in the telephone survey were limited to encourage participation from these individuals, who had already not responded to two mailed questionnaires and two mailed reminders. The phone interviews were conducted during the month of February, 1989. Project staff drew a sample of 573 nonrespondents to the mail survey (20% of all non-respondents), and located telephone numbers for 404 non-respondents (70.5%) through telephone directories and Directory Assistance. ISR telephone staff obtained responses from 260 of the 404 non-respondents in the sample. For this survey, responses were obtained from beneficiaries when possible, but responses from an informant were acceptable in cases in which the beneficiary was unable to personally respond. In addition to the 260 responses to the survey, we learned of 5 deaths among this sample. There were 71 refusals, 21 other non-interviews, and contact was not made with 47 individuals after repeated attempts.

When the health status data obtained from the mail survey and the nonrespondent survey were analyzed together, no significant bias was found. Using Ordinary Least Squares regression analysis, with health status as the dependent variable and enrollment status, response status, age and sex as independent variables, tests of non-response bias

were conducted. This analysis indicated that "respondents" have significantly higher mean health scores than "nonrespondents" (p = .0001). However, the enrollment status variable was not significant in this model (p = .28), indicating that the difference between health scores for respondents and nonrespondents is the same for enrollees and nonenrollees. Therefore, we concluded that there were no systematic differences in health status that would bias the results of our study.

3.3. CONSTRUCTION OF MEASURES

In the following section, details of the construction of the dependent and independent variables are presented. These include health status (the dependent variable) and variables describing market areas, HMOs, and marketing activities, including content analysis of promotional materials (independent variables).

3.3.1. HEALTH STATUS OF BENEFICIARIES

Computation of Health Scores

The survey instrument used in the mail survey of beneficiaries contained a set of 16 health status questions. These questions, which were presented in Table 6 in Section 3.2.4., are a modification of the Rand Corporation's Physical Capacities Index. Questionnaires returned with responses to any questions were obtained from a total of 6,581 individuals. Of these, 6,303 individuals (95.8%) had completed the functional health questions. The completed responses were analyzed using Scalogram Analysis (Guttman, 1944) to determine the number of scale levels into which the items should be grouped. We compared the results obtained by grouping the items into 8 categories (yielding a 9-level scale) and into 9 categories (yielding a 10-level scale). The 8 category (9-level) scale yielded a CR of .9442 and CS of .7247, while the 9 category (10-level) scale yielded a CR of .9267 and CS of .6899. The higher Guttman scaling coefficients obtained by the 8 category grouping (9-level scale) indicates that it is a more reliable scale. The health status scale with 8 categories (9 levels) was therefore chosen to be the measure of health status used in the study. This health status scale is presented in Table 9.

In creating the health status scale, items that scaled closely were combined into a single level. This resulted in levels that were computed based on one, two or three items. Stringent criteria were devised for combining items into level scores: we required that all items were answered "Yes" in order to assign a "Yes" score to a level. For example, Level 5 is composed of three items: "travel without assistance," "walk a block or more," and "walk uphill." If a respondent could travel without assistance and walk uphill, but could not walk a block or more, a NO score would be assigned.

Examination of the returned questionnaires showed that we were unable to compute health scores due to missing data for 278 respondents. This represented 4.2% of all individuals who returned answered questionnaires. Analysis of these 278 cases yielded 78 cases in which individuals had skipped a response at only one level, and where the responses "above" (harder tasks) and "below" (easier tasks) the missing response were the same (for example, Yes - missing - Yes). It was determined that assigning health scores for these 78 cases would not significantly change the distribution of scores. No pattern was found in the missing responses for the remaining 200 individuals with missing health status data. Therefore, no health scores could be assigned for these individuals and they are omitted from the analysis.
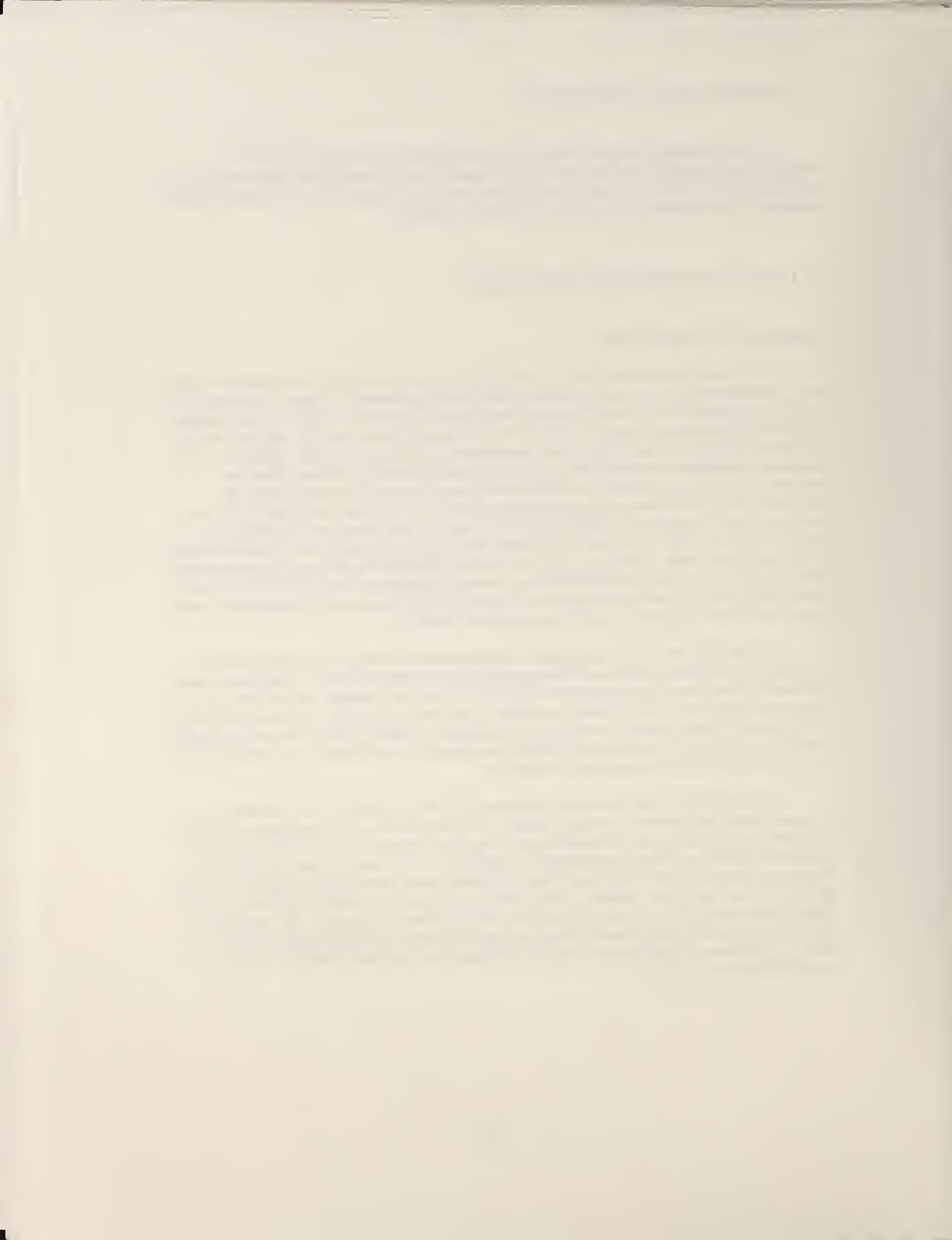
TABLE 9

9-LEVEL FUNCTIONAL HEALTH STATUS MEASURE

Level	Statement
0	I can do none of the following.
1	I can walk to the table, eat, and go to the bathroom to use the toilet. (Basic self-care)
2	I can take a bath or shower and dress myself. (Grooming)
3	I can do light and moderate work around the house. (Housework)
4	I am not in a bed or chair most of the day, nor do I have to stay indoors. (Get around)
5	I can travel without assistance, walk a block or more, and walk uphill. (Self-mobile)
6	I can run a short distance. (Running)
7	I can do anything I want. (Unlimited)
8	I can play sports and move heavy objects. (Strong)

3.3.2. ORGANIZATIONAL, MARKET AREA AND MARKETING VARIABLES

Creation of HMO Variables and the HMO Data Codebook

Subsequent to collecting HMO data, HMO variables were created, a coding scheme for these variables was developed, and an HMO codebook was compiled. An attempt was made to create variables for most aspects of the HMOs' organizational structure and delivery system and for HMO activities that might have an effect on enrollment outcomes. Therefore, in addition to creating variables and a coding scheme to describe straightforward facts, such as the age of the HMO, considerable effort was devoted to creating variables and a coding scheme for "intangibles" such as the organization's mission.

The final codebook includes variables and codes describing organizational structure including maturity, HMO enrollment, model type, and organizational mission. It includes variables for HMO delivery system attributes, such as numbers of physicians and hospitals associated with the HMO; benefit package variables such as premium and covered benefits for the *Medicare plan*; and advertising variables such as advertising expenditures and numbers of "impressions" obtained through the use of various mass and personal media. It includes variables describing other promotional efforts of HMOs such as community meetings and events, and the steps which must be taken by a potential enrollee in order to enroll. The codebook also includes variables describing market area characteristics including penetration rate of the HMOs among Medicare beneficiaries, market size, and the price of the most common Medigap policy in the community. Due to the scope of the data collected about the HMOs, and the "fuzzy" nature of some of the data, the codebook underwent a number of revisions. The final Codebook is presented in Appendix F.

HMO data were collected primarily through the site visits and through the organizational and advertising questionnaires, as discussed in Section 3.2.2. Data for the market-area variables, such as population of the market area and price of the most popular Medigap policy in the market, were obtained by project staff from a variety of sources. These included the UHHIMRS data tapes obtained from HCFA, professional marketing publications, and local Blue Cross/Blue Shield plans.

Coding of HMO Data

Two part-time coders were hired to code the data obtained about the 22 study HMOs, using the organizational and advertising questionnaires and site visit reports as data sources. The part-time coders had not visited the HMOs. After independently coding the first two HMOs, the coders met with project staff. The coded data were compared and "problem variables" were identified and discussed. These included characterization of the organization's mission, enrollment activities, and other promotional efforts. For these items, a strategy of "double-coding" was devised: both coders independently coded these items for all 22 HMOs. A total of 40 codes in the codebook (out of 146) were identified by the coders as being problem codes. After excluding eight "problem variables" which needed to be double-coded, interrater reliability for the the remaining variables coded for the first HMO was 93%.
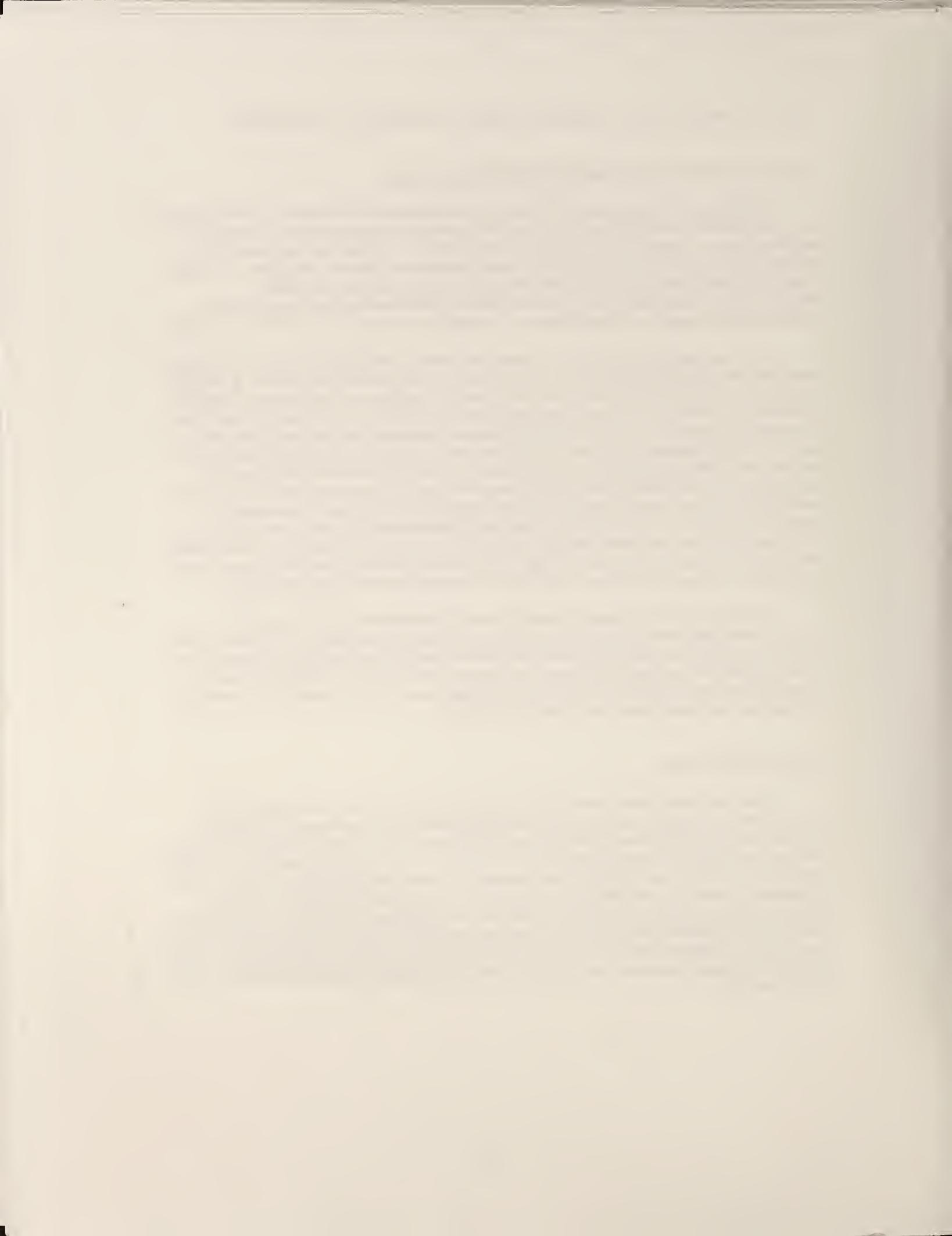
Each coder was randomly assigned half of the HMOs, and completed a codesheet for each assigned HMO. Each coder also filled out the 40-item problem codesheet for the HMOs completely coded by the other coder. In several instances, the coders found that two data sources contained differing information. In these cases, the coders researched the item to determine the correct information. In several cases, questions asked by project staff during site visits elicited responses from HMO staff that did not agree (for example, the HMO's CEO might state that the HMO was involved in risk contracting because the elderly were seen as an important part of the market, while the Medicare program coordinator might state that the HMO was involved in risk contracting because the elderly were a needy or deserving group of individuals). After the complete codesheet and the problem codesheet were filled out, the coders met with project staff to compare the problem codes and resolve disagreements. Most disagreements occurred when statements made by HMO staff were characterized differently by the two coders, and were especially common when coding mission, organizational enrollment targets, etc. These discrepancies were resolved through discussing the rationale behind coding decisions, after which agreement was reached between the coders as to the appropriate code for each variable.

After the coding for all 22 HMOs was completed, project staff input the data into a data file on the University's mainframe computer. The data were then available for inclusion in statistical analyses.

3.3.3. CONTENT ANALYSIS CODES

There were a total of 100 variables in the content analysis portion of the project. Three types of content variables were defined and coded: "presentation of services offered by HMOs," "types of actors/models presented," and "the presentational style of the print and audio-visual advertisements." A list of these variables is presented in Table 10, and the Content Analysis codebook is attached as Appendix G. In general, each variable was predicted to be related to selection bias in that a rational marketing strategy would be likely to use particular content (e.g., healthy active senior models, emphasis on health maintenance services) and presentational strategies (e.g., smaller print, more rapid visual presentations) if the intent was to appeal to a healthier-than-average senior population.

Each HMO was asked to submit copies of all advertising used during the 5-month period studied (the 3 month enrollment period plus the preceding 2 months). This resulted in a total of 255 advertisements from 23 HMOs.

Content Analysis Coding Activities

Content analysis coding took place over a number of months, as HMOs returned their Advertising Questionnaires along with copies of their promotional materials. There were two part-time content analysis coders. Approximately half of the promotional materials were double-coded (coded by each coder independently). Throughout the coding activity, interrater reliability exceeded .80, which is the generally-accepted level for content analysis.

TABLE 10
LIST OF CONTENT ANALYSIS VARIABLES

Presentation of Services Offered by HMOs
       Easy enrollment procedures
       Difficult enrollment procedures
       Coverage of services outside service area
       Minimal paperwork
       No health screening before enrollment
       No disenrollment by HMO
       Convenient location
       Expenses are fixed or known in advance
       Easy access to specialist
       Stability of plan
       Enrollee can choose a personal physician
       Enrollee can choose from a list of hospitals
       Waiting times to get an appointment are reasonable
       Home health care is a covered benefit
       Skilled Nursing Facility is a covered benefit
       Outpatient drugs are a covered benefit (with or without a copayment)
       Health maintenance is an HMO goal
       Vision care is a covered benefit
       Hearing tests/hearing aids is a covered benefit
       Hospitalization is covered in full
       Routine physical exams are covered in full

Types of Actors/Models Presented
       (these variables are COUNTS of the number of times the type of actor/model is
       presented in an advertisement)
       Male seniors
       Female seniors
       White seniors
       Nonwhile seniors
       Composition of image:
              Single person facing camera
              Single person looking at an (implied) other
              Single person engaged in a solitary activity
              Multiple people, all seniors
              Multiple people, all support people (support people are friends, relatives,
                    etc., not including doctors, nurses, and other health care staff
              Multiple people, mix of seniors and support people
              Multiple people, at least one is "medical" person (medical people are
                    doctors, nurses, receptionists, etc.)
       Mobility of seniors in image:
              Disabled/incapacitated (unable to walk)
              Restricted (capable of movement with assistance)
              Static (no obvious difficulty in moving, but scene gives no clues as to ability
                    to move)
              Moderately active (walking without assistance)
              Highly active (engaged in vigorous activities)
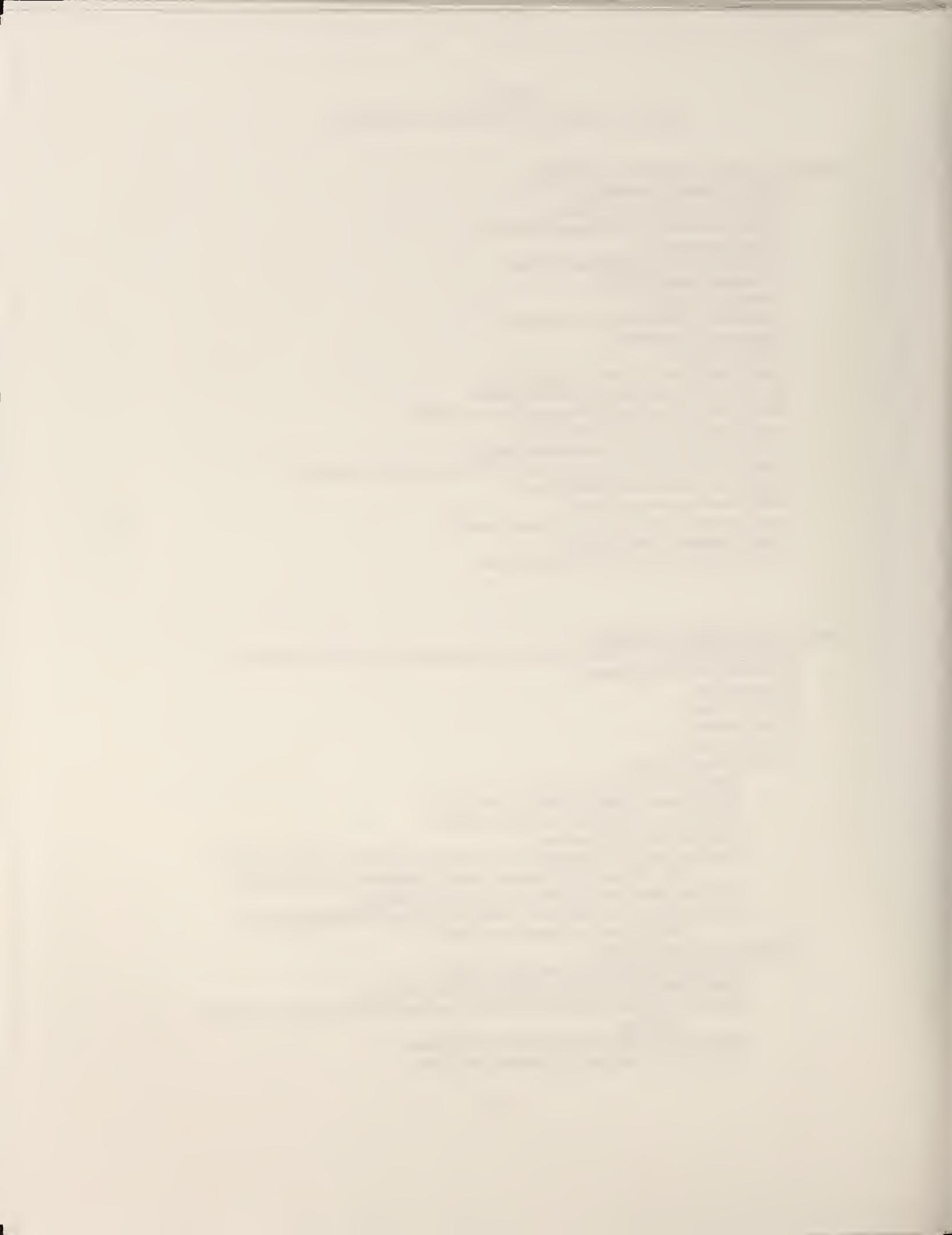
Types of Actors/Models Presented, continued
 Very ill seniors (disabled/incapacitated, and receiving health care)
 Ill seniors (seated or standing, not in street dress, and receiving health care)
 Well seniors (seated, in street dress, and receiving health care)
 Healthy seniors (standing, in street dress, and receiving health care)
 Non-seniors
  Male medicals
  Female medicals
  Male supports
  Female supports
  White medicals
  Nonwhite medicals
  White supports
  Nonwhite supports

Presentational Style of the Print and Audio-Visual Advertisements
 1. Audio and Video Information
  Duration in seconds
  Audio pace (number of words in the spot)
  Audio clutter (number of seconds in which there is music and/or sound
    effects under narration)
  Number of camera cuts (TV only)
  Number of different scenes/physical locations shown in the ad (TV only)
  Number of different groupings of characters occurring in the ad (TV only)
  Number of seconds of audio/video redundancy (TV only)
  Number of seconds of straight narrative (TV only)

 2. Print Media Only
  Total square inches of the print material (height X width X number of
    pages)
  Number of square inches of pictures
  Number of pictures
  Number of square inches of graphics
  Number of graphics
  Primary (most commonly-used) text size
  Primary text leading (space between lines of text)
  Secondary (second-most commonly-used) text size
  Secondary text leading (space between lines of text)
  Border area (total square inches of borders on all pages of the print
    material)
  Number of lines all in bold characters
  Number of lines in which any italicized/stylized text appears
  Number of lines in which all characters are capitalized
  Number of long lines (over 4.5" long)
  Word count (number of words in a set of 10 sentences, randomly chosen
    from the print material)

3.4 ANALYTICAL APPROACH

The analytical approach planned for the study consisted of several steps. The initial analytical task was to create a measure of the risk selection experienced by each of the study HMOs. Risk selection was measured by computing the difference in health status between groups of enrollees and their comparison group of nonenrollees, and these differences were tested for statistical significance. Based on this test, a trichotomous risk selection variable was created with the following levels: enrollees in an HMO are significantly healthier than the comparison nonenrollee group, not different from the comparison group, or significantly less healthy than the comparison group. As discussed in Section 4.2., no groups of enrollees were found to be significantly less healthy than the comparison group of nonenrollees. Based on this finding, a dichotomous variable of selection bias (healthier versus no difference) was created.

After creation of a dependent risk selection variable, statistical tests were conducted to identify relationships between risk selection and the following predictors: organizational variables, market area variables, marketing activity variables, and variables describing the content of promotional materials. These tests were conducted using a variety of statistical procedures including Chi-square based and other measures of association, Cochran-Mantel-Haenszel two-way partial associations, or Weighted Least Squares regression analysis. In the process of implementing these analyses, a number of statistical issues were encountered that had to be addressed. In the following sections the approaches used to handle these issues are discussed.

3.4.1. HEALTH STATUS MEASURES

Modified Bonferroni Test Levels

The initial analytical task in this study was to create a measure of the risk selection experienced by the 23 study HMOs. In order to accomplish this, some 23 comparisons between enrollee groups and nonenrollee groups were made. These comparisons were not completely independent, since more than one HMO was studied in some of the study cities.

When making a number of simultaneous comparisons, it is possible that some might be significant simply by chance. Methods for adjusting the test procedure to account for this possibility were considered in order to decrease the chance of obtaining spurious findings. Multiple comparison procedures such as the Bonferroni and the Tukey were examined. It was determined that dividing the overall significance level for a family of tests by the number of tests in the family, to obtain a test-specific significance level, was the most convenient and appropriate method.

An overall significance level of 0.05 was chosen for the comparisons of mean health status. A straightforward Bonferroni correction would call for dividing this overall significance level by the total number of comparisons being made, or $0.05 / 23 = 0.00217$.

This approach requires quite a strict standard for significance for each individual test. The comparisons made between the HMOs and the nonenrollees were always made within a city, and thus are not independent tests because each HMO is compared to the same nonenrollee sample in the city. On the other hand, the comparisons made in different cities are independent. It was thus decided not to apply a single overall significance level for all 23 tests, but to maintain a significance level for each city. A modified Bonferroni correction was chosen as the appropriate statistical adjustment in which the 0.05 significance level was divided by the number of HMOs studied in a city. For example, in a city where two HMOs were studied, the significance level of each individual HMO comparison was fixed at 0.05 / 2 = 0.025.

Age- and Sex-Adjustments to Mean Health Scores

Upon examination of the age and sex distribution of enrollees and nonenrollees, it was determined that enrollees were consistently younger than the comparison nonenrollee groups. Given these differences in the age distribution, and the fact that these differences are taken into account in the computation of the payment to the HMOs (the AAPCC), a decision was made to standardize the mean health scores to reflect the differences in age (and sex). Using the direct standardization method, the health scores were adjusted to a standard age/sex distribution: the 7/1/87 U.S. Bureau of the Census estimates for the distribution of the age 65+ population (the 7/1/88 projections were not yet available). The proportion of the standard population in each of 8 specified age/sex groups (65-69M, 65-69F, 70-74M, 70-74F, 75-79M, 75-79F, 80+M, 80+F) was computed. After categorizing each enrollee and nonenrollee by age/sex group, the individual's health score was multiplied by the proportion of the standard population in the age/sex group. In effect, for each HMO and nonenrollee group, the mean health status was also weighted by this method.

T-tests with Unequal Variance

T-tests were conducted to compare the mean health status of enrollees in each HMO with the mean health status of the relevant comparison group of nonenrollees. It was observed that the variance of health status in HMO and nonenrollee samples differed, with significantly greater variance among nonenrollees than enrollees. Therefore, a test based on separate rather than pooled variances was used for all such comparisons.

Finite Population Correction

Different sampling fractions were used in choosing the various enrollee and nonenrollee samples. Generally, the enrollee samples were drawn from populations of several hundred to several thousand individuals. The nonenrollee samples, on the other hand, were drawn from populations of much greater size, such as the entire Medicare population in the relevant counties, often reaching a size of several hundred thousand people. Therefore, we examined the effect of adding a finite population correction (f.p.c.) to the variance estimate. The f.p.c. is calculated as $(1 - n/N)$, where n is the sample size and N is the size of the population from which the sample was drawn.

In computing the t-statistic, the standard error for each group is multipled by the square root of the f.p.c. Using the f.p.c. in this manner results in larger t-statistics and smaller p-values than would otherwise be obtained. That is, this is a less "conservative" method of calculating differences in mean scores since some of the f.p.c.'s for enrollee samples were small when the enrollee sample was drawn from a small populations and represented a large fraction of the population.

The results of tests for differences in adjusted means including the f.p.c. were very similar to the results obtained by testing differences in adjusted health status means using ordinary t-tests or by regression analysis (discussed below) without the f.p.c. Because the f.p.c. did not change the results, because ignoring the f.p.c. is statistically conservative, and because the f.p.c. complicates the analysis for the reader, it is not included in the results presented below.

<u>Regression Analysis of Health Status</u>

In addition to the simple comparisons of adjusted means described above, least squares regression methods were also used to test for differences in health status between enrollees and nonenrollees. Regression models were constructed for each HMO which regressed health status (the dependent variable) on combinations of age, sex, enrollment status, and interactions between these variables as predictor variables.

Four different regression models were tested for each HMO in which different sets of independent variables were used in each model. Some models included the interaction terms. Two models included age as a continuous variable, while the other two had age as a set of categorical variables (the AAPCC model includes age as a categorical variable). The four models are presented in Table 11.

The analysis began by comparing the models which used the continuous age variable (Models 1 and 2) with the models which used the categorical age variable (Models 3 and 4). The models using the continuous age variable did not perform noticeably better than the models using the categorical age variables (the R^2 in the "continuous models" was not consistently higher than the R^2 in the "categorical models"). Because the AAPCC payment methodology treats age as a categorical variable, subsequent analyses were conducted using the models with the categorical age variables (Models 3 and 4).

The regression results from Models 3 and 4 were used to examine the issue of "non-parallelism" in the relationship between health status and demographic factors in the enrollee versus nonenrollee groups. It was of interest to determine whether age and health status (and sex and health status) were related similarly among enrollees and nonenrollees in order to provide direct tests of enrollment status controlled for age (and sex). If interaction existed, i.e., the interaction terms for age and enrollment and for sex and enrollment were significant, we could not draw conclusions about differences in health status without specifying the age and sex of the individuals being compared. Fortunately, it was found that the interaction terms were significant in only one regression out of the 23. Since one significant result out of 23 tests could merely be due to chance, it was concluded that there are no significant interaction effects and, therefore, Model 4 (i.e., the no interaction model) was adopted. Results are presented in Section 4.2.
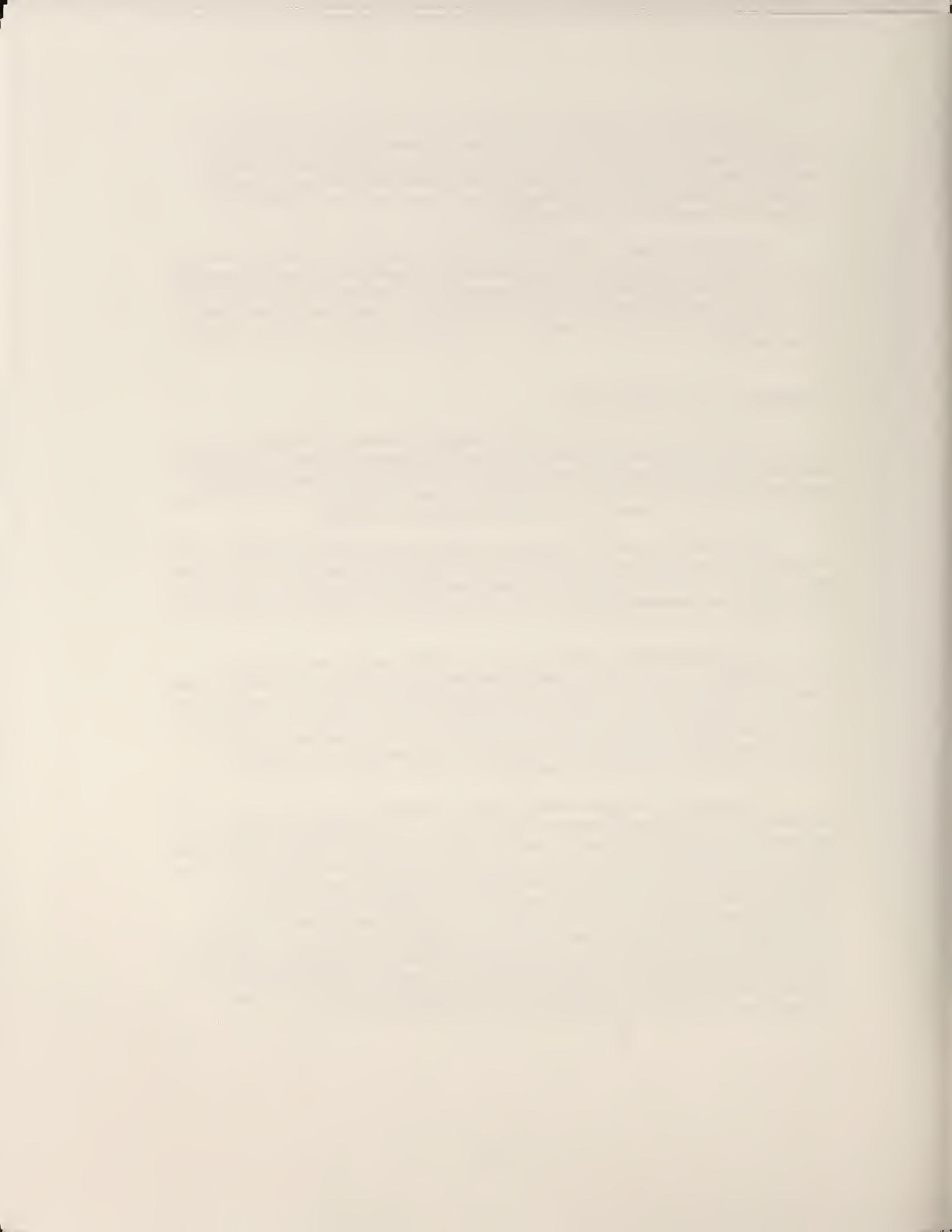
TABLE 11
COMPARISON OF FOUR REGRESSION MODELS*

Model
Number   Variables in the Model

1   Enrollment Status
                  Age (continuous)
                  Sex
                  Enrollment-Age interaction term
                  Enrollment-Sex interaction term

2   Enrollment Status
                  Age (continuous)
                  Sex

3   Enrollment Status
                  Categorical Age variable #1 (65-69)
                  Categorical Age variable #2 (70-74)
                  Categorical Age variable #3 (75-79)
                  Sex
                  Enrollment-Age interaction term #1
                  Enrollment-Age interaction term #2
                  Enrollment-Age interaction term #3
                  Enrollment-Sex interaction term

4   Enrollment Status
                  Categorical Age variable #1 (65-69)
                  Categorical Age variable #2 (70-74)
                  Categorical Age variable #3 (75-79)
                  Sex

* A separate set of equations was developed for each HMO in the study.

3.4.2. ISSUES IN IDENTIFYING VARIABLES ASSOCIATED WITH RISK SELECTION

Under the original analytic plan, analyses of the relationship between organizational, market area, and marketing variables and risk selection were to be accomplished using both Chi-square and regression models. Organizational, market area, and marketing variables were categorized and then cross-classified against the dichotomous (favorable selection/neutral selection) dependent variable. To determine if selection bias was more common among one group than the other defined by the dichotomous organizational, market area, or marketing variables, a Chi-square test was computed. However, due to the small sample sizes (n = 23), the standard large sample test was not valid, and a Fisher's exact test procedure was used instead.

An alternative approach was to use a weighted least squares (WLS) regression approach. Three dependent variables were used: the difference in mean health status between enrollees and nonenrollees or one of the Relative Health Indices that compared enrollees to nonenrollees at the two tails of the health status distribution (the computation of these Indices is described in Section 4.2.). Because sample sizes varied across HMOs, the differences and Relative Health Indices had different variances for each HMO. The usual OLS regression assumption of equal variance for each of the n = 23 observations could not be met, and thus a weighted least squares approach was used. Here, the "weight" was the variance of the difference or the Relative Health Index for each HMO.

Initial analyses demonstrated two problems which had been anticipated, but which proved to be bigger constraints than expected. These problems are briefly identified and then are discussed in greater detail below. The first problem was that the small number of cases to be studied (the 23 HMOs which were the unit of analysis in these investigations) lowered the power of the ordinary Chi-square tests to the point that even relationships that seemed strong when viewing a 2x2 table did not prove statistically significant. It was thus decided not to use either the Chi-square or Chi-square related procedures (such as the Cochran-Mantel-Haenszel test) in the analysis. The second problem was that three of the cases were found to influence substantially the results of regression analyses. These three HMOs had enrolled substantially fewer new enrollees than the other 20, and appeared from many perspectives to be quite different from the other HMOs. Further, because their samples were small, they had comparatively larger variances and thus larger weights in the WLS regression analysis. It was decided that they should be dropped from the analysis.

Individual organizational, market area, and marketing variables were run against the dichotomous dependent variable, and probabilities of relationships were computed using the Fisher's exact 2-tailed test (appropriate because expected cell sizes were under 5). Only nine variables, listed in Table 12, proved to be significantly related to risk selection at the 0.10 level. Yet, simple observation of the Chi-square tables indicated that several important relationships between independent and dependent variables seemed to be emerging. Unfortunately, the power of the Chi-square test was so attenuated by small sample size that few statistically significant results were obtained. For example, in the Chi-square table relating Total Number of enrollees in the HMO to risk selection (favorable/neutral) the data were distributed as shown in Table 13.

TABLE 12
ORGANIZATIONAL, MARKET AREA, AND
MARKETING VARIABLES SIGNIFICANTLY *
RELATED TO RISK SELECTION
USING CHI-SQUARE TESTS

Variable	Selection Result
Having a demonstration contract	Neutral selection
Being a staff model HMO	Favorable selection
Having a risk contract because employer groups demand it	Favorable selection
Larger # of TEFRA enrollees in HMO	Neutral selection
Larger # of HCFA enrollees in all HMOs in the market area	Neutral selection
Lower TEFRA penetration rate in market area	Favorable selection
Use of a promotional strategy with reliance on Direct Mail	Favorable selection
Requiring a copayment for any inpatient hospitalization	Favorable selection
Use of newspaper advertisements	Favorable selection

* Significant at .10 level using Fisher's Exact 2-tail test

TABLE 13
2X2 Table: Total Number of Enrollees and Risk Selection

	Less than 600,000 Members	600,000 or more Members	Total
Neutral Selection	11	3	14
Favorable Selection	4	5	9
Total	15	8	23

Yet, the probability of a significant relationship between these variables computed using the Fisher's exact 2-tailed test was only 0.179. Several similar results are presented in Table 14.

As a result of these findings, it was decided to use weighted least squares regression with continuous variables (e.g., the Relative Health Indices or differences in means) rather than the dichotomous variable as the dependent variable.

The second problem was with the three small sample HMOs. Each had either decided (after being selected for the study) to change their marketing strategy and not to actively market to the public, or had not attracted many enrollees despite their marketing efforts. These HMOs only enrolled 85, 48 and 83 new enrollees respectively. After running the WLS regressions on all 23 cases, concerns arose about the influence of these three cases on the regression coefficients that were obtained. Therefore, a series of diagnostic measures were examined, including Studentized residuals, Cooks' D (Cook's distance measure), and leverage. Given the results of these diagnostic tests, it was decided that these three cases were indeed influential and it was decided to exclude these three cases from further analyses.

Although dropping three cases from the data set further reduced our already limited number of cases, it was felt that since WLS regression was to be the approach of choice (as opposed to Chi-square based tests) and since these cases were clearly "outliers," that dropping these cases was an acceptable decision.

Regression Analysis Strategy

Given the large number of independent or predictor variables generated in this study and the small number of HMOs (and, thus, degrees of freedom in the analysis), a strategy for limiting the number of independent variables that would be tested in regression models was developed. The strategy contained the following steps: 1) All predictor variables would be used for each different dependent variable individually. Based on these results, variables related to health status differences between enrollees and nonenrollees and those that weren't could be identified. 2) Using simple Pearson r correlations, variables that were highly correlated and that also were significantly related to health status differentials were identified and only the variable(s) that were most
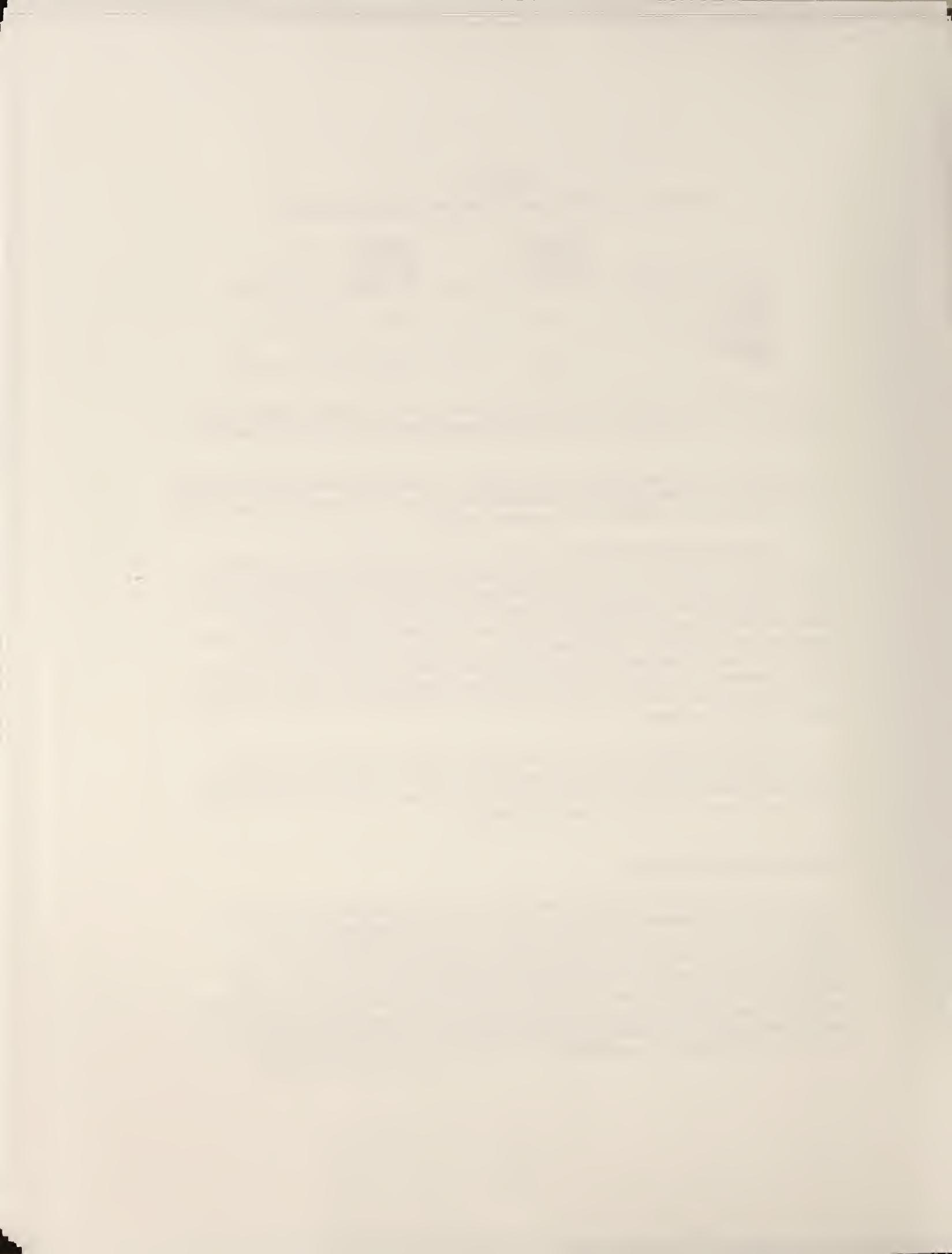
TABLE 14
EXAMPLES OF 2X2 TABLES AND FISHER'S EXACT TESTS (2-tail)

MEDICARE EXPERIENCE BEFORE TEFRA

	NO	YES	Total
Neutral Selection	3	10	13
Favorable Selection	4	5	9
Total	7	15	22

FISHER'S EXACT 2-tail p-value: 0.376

USE OF RADIO ADVERTISING

	NO	YES	Total
Neutral Selection	8	2	10
Favorable Selection	3	5	8
Total	11	7	18

FISHER'S EXACT 2-tail p-value: 0.145

BASE MONTHLY PREMIUM

	$30 or less	More than $30	Total
Neutral Selection	10	4	14
Favorable Selection	3	6	9
Total	13	10	23

FISHER'S EXACT 2-tail p-value: 0.102

HMO PREMIUM COMPARED TO MEDIGAP

	HMO less than Medigap	HMO more than Medigap	Total
Neutral Selection	11	3	14
Favorable Selection	4	5	9
Total	15	8	23

FISHER'S EXACT 2-tail p-value: 0.179
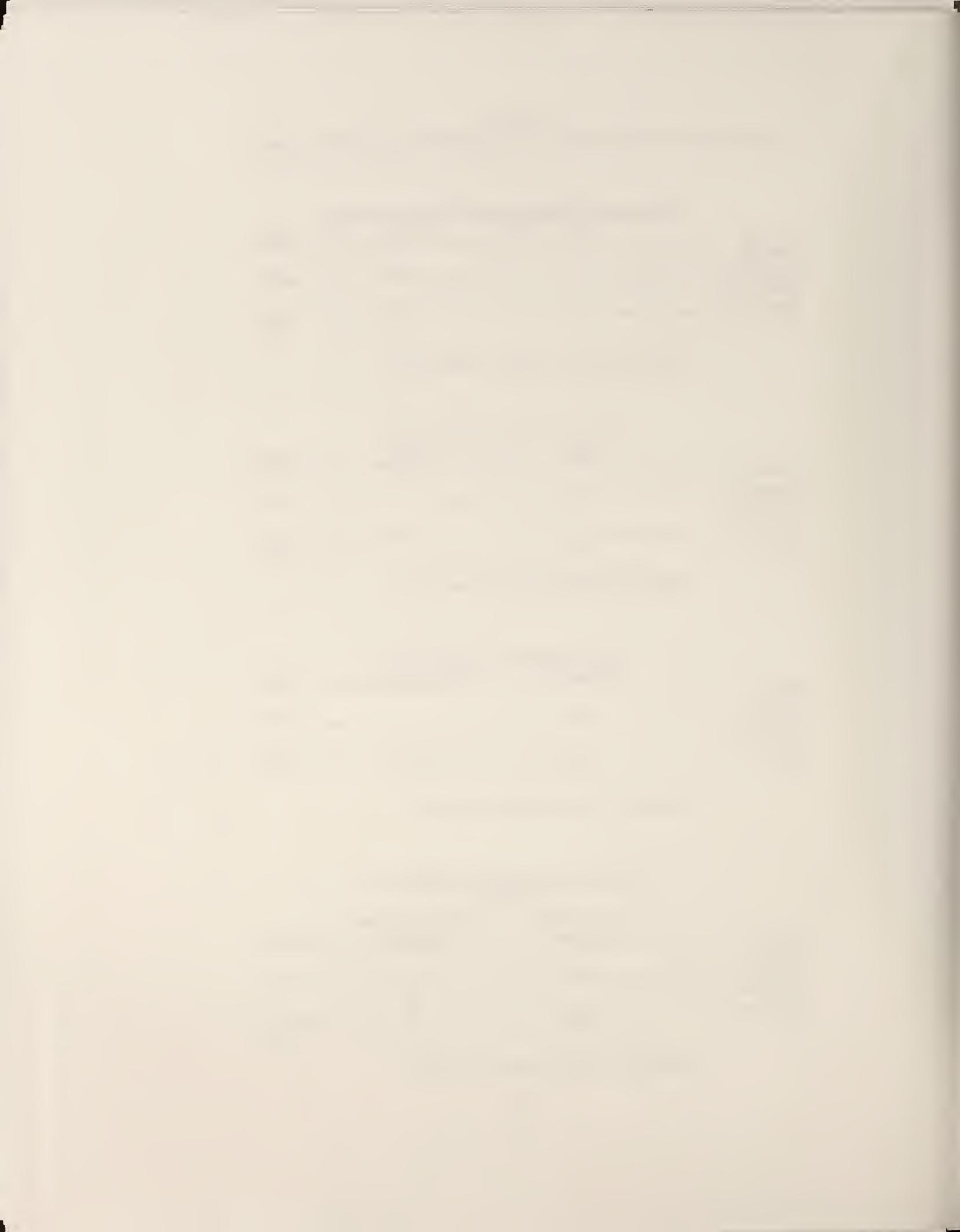
TABLE 14, continued
EXAMPLES OF 2X2 TABLES AND FISHER'S EXACT TESTS (2-tail)

USE OF "INSIDE"
TELEMARKETING REPRESENTATIVES

	NO	YES	Total
Neutral Selection	3	10	13
Favorable Selection	5	4	9
Total	8	14	22

FISHER'S EXACT 2-tail p-value: 0.187

HMO HAD HCPP CONTRACT

	NO	YES	Total
Neutral Selection	13	1	14
Favorable Selection	6	3	9
Total	19	4	23

FISHER'S EXACT 2-tail p-value: 0.260

strongly related were retained for further analysis, 3) As a further means of reducing the number of variables to be used in regression models, several factor analyses were run to try to construct variables from sets of original variables. For example, several market area variables were factor analyzed to construct a single market area index based primarily on population size and HCFA penetration rate. 4) When any HMO organizational or market area variables strongly related to health status differentials were identified, those variables were included in subsequent models to control for the effects of this (these) variable. 5) The number of independent variables entered into the regression models was restricted so that the available degrees of freedom for error was not too limited. Although this strategy (and the data themselves) would restrict our ability to run larger multiple regression models, it was believed that in an exploratory study such as this, the results obtained would make maximum use of available data and permit the identification of key variables. The results of each of these steps in the "regression strategy" appear in Section 4.5.

3.4.3. LIMITATIONS OF THE DATA

Section 3.2.1. contains a description of the strategy used to choose HMOs for this study. It is recognized that the chosen HMOs do not constitute a random sample of HMOs with TEFRA risk contracts, and that this could limit the generalizability of the results to those HMOs and cities selected. However, the purpose of the study was to examine relationships between marketing strategies and selection bias, making it necessary to eliminate from consideration those HMOs that were not involved in active marketing. It should also be kept in mind that even though only a sample of those HMOs actively marketing the TEFRA risk program to Medicare beneficiaries were included in the study, those HMOs chosen do constitute a large portion of the actively-marketing HMOs.

Another potential limitation of the study is that some individuals who were nonenrollees at baseline may subsequently have enrolled in a study HMO, or a non-study HMO. Individuals could have chosen to join a study HMO after the HCFA tapes were prepared and before the study period, or after the study period but before the beneficiary survey was fielded. They also could have joined a non-study HMO at any time after the HCFA tapes were prepared. Among responding nonenrollees, 11% identified an HMO or Prepaid Group Practice as their source of health insurance. We can't be sure of the respondent's basis for these answers because the nonenrollees might use the term HMO for a fee-for-service plan, might receive care from an HMO physician or an HMO delivery site but on a fee-for-service basis, might have a wrap-around indemnity policy from an HMO, or might have some other coverage which wouldn't make them HMO risk-program enrollees. We cannot assess completely the extent to which nonenrollees may have enrolled, but it is clear that the net effect would be to attenuate the health status differences we were examining. Thus, differences observed in this study are, if anything, smaller than would be observed in a more completely controlled study.

The third potential limitation of the study is that analyses of relationships between risk selection organizational, market area, and marketing variables were subject to the constraints of small sample size. As discussed in Section 3.4.2. above, appropriate analytical methods were carefully chosen to minimize the problems associated with small sample size.
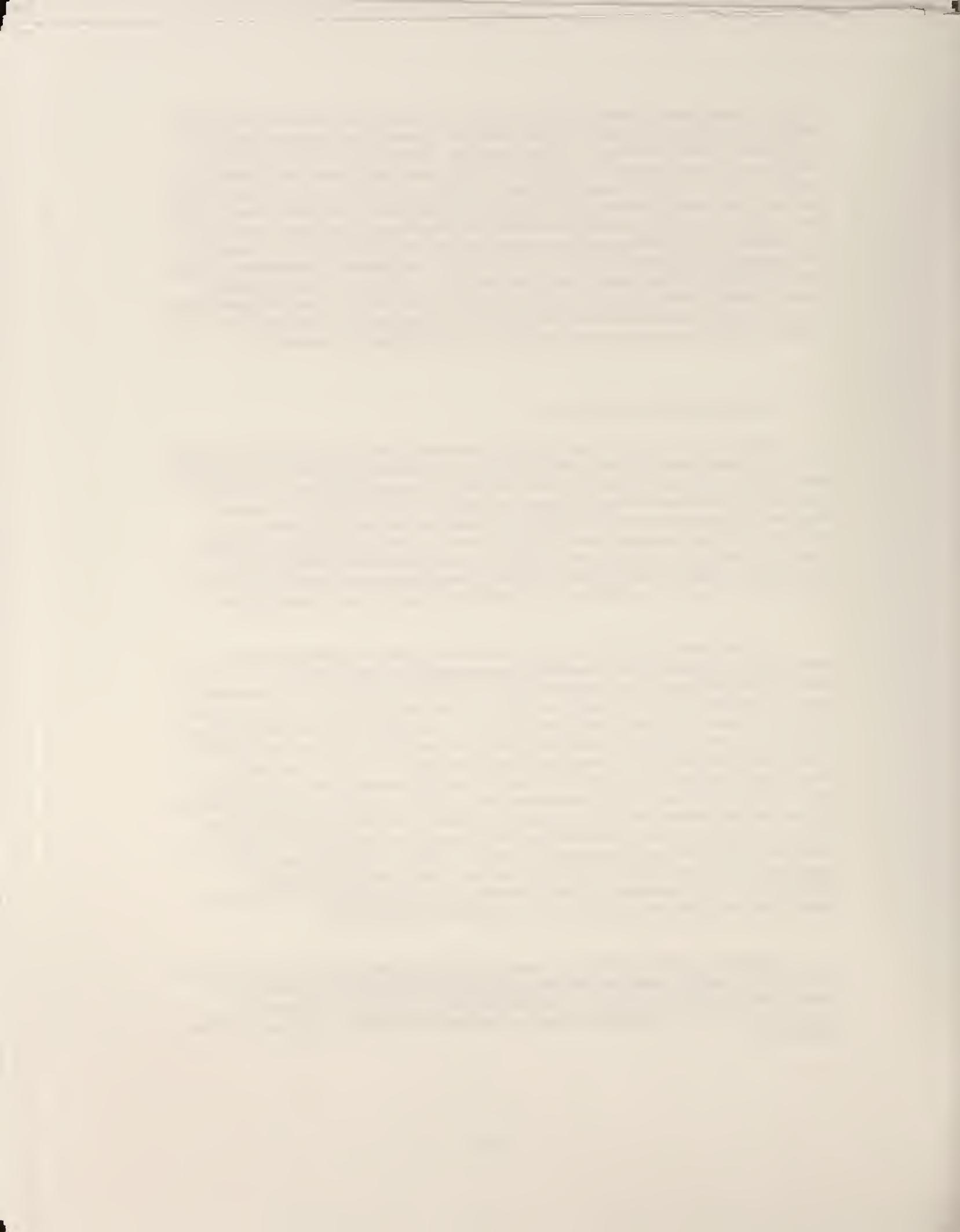
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4.0. RESULTS

In the following sections, descriptive statistics about organizational, market area, marketing, and promotional variables are presented. Results of analyses of the risk selection experienced by the study HMOs are presented, and results of the analysis of relationships between risk selection and organizational and marketing variables and promotional activities are presented.

It should be noted that these results are presented in a way that protects the anonymity of participating HMOs and complies with our assurance of confidentiality. Since revealing the number of HMOs studied in a city might betray the identities of HMOs in those cities, we sometimes cannot reveal as much about the data as would be done were these *constraints not* in place. The fact that these constraints limit the ability of the reader to follow all statistical processes and conclusions completely recognized, but such limitations were necessary if the study was to be done at all.

4.1. UNADJUSTED HEALTH STATUS, AGE, AND SEX

Unadjusted Health Status

Using the 9-point health status scale described in Section 3.3.1., mean health status was computed for the respondents in each group of enrollees and nonenrollees in the study. Table 15 shows the mean health status for each HMO, the value of the t-statistic comparing each HMO with the relevant nonenrollee comparison group, the p-value of the t-statistic, and whether the comparison is significant using the modified Bonferroni test level described in Section 3.4.1. Due to confidentiality constraints, it is not possible to show a direct comparison between any enrollee group and the relevant nonenrollee comparison group, or to indicate the test level that was used for any HMO. As shown in this Table, when comparing mean health scores, the p-value for 15 of the HMOs is less than .05. However, after applying the Bonferroni correction, only 11 of these comparisons are statistically significant.[1]

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[1] In an effort to precisely specify the response rate for the survey of beneficiaries, mortality data for 1988 for beneficiaries in the survey samples were obtained from HCFA. These mortality data provide another measure of the health status of the beneficiaries. While the survey was being fielded and after the survey activity was completed, 70 enrollees (1.15% of the enrollee sample) died, and 98 nonenrollees (2.47% of the nonenrollee sample) died. The much higher death rate for nonenrollees (more than twice that of enrollees) supports the conclusion that enrollees are generally healthier.
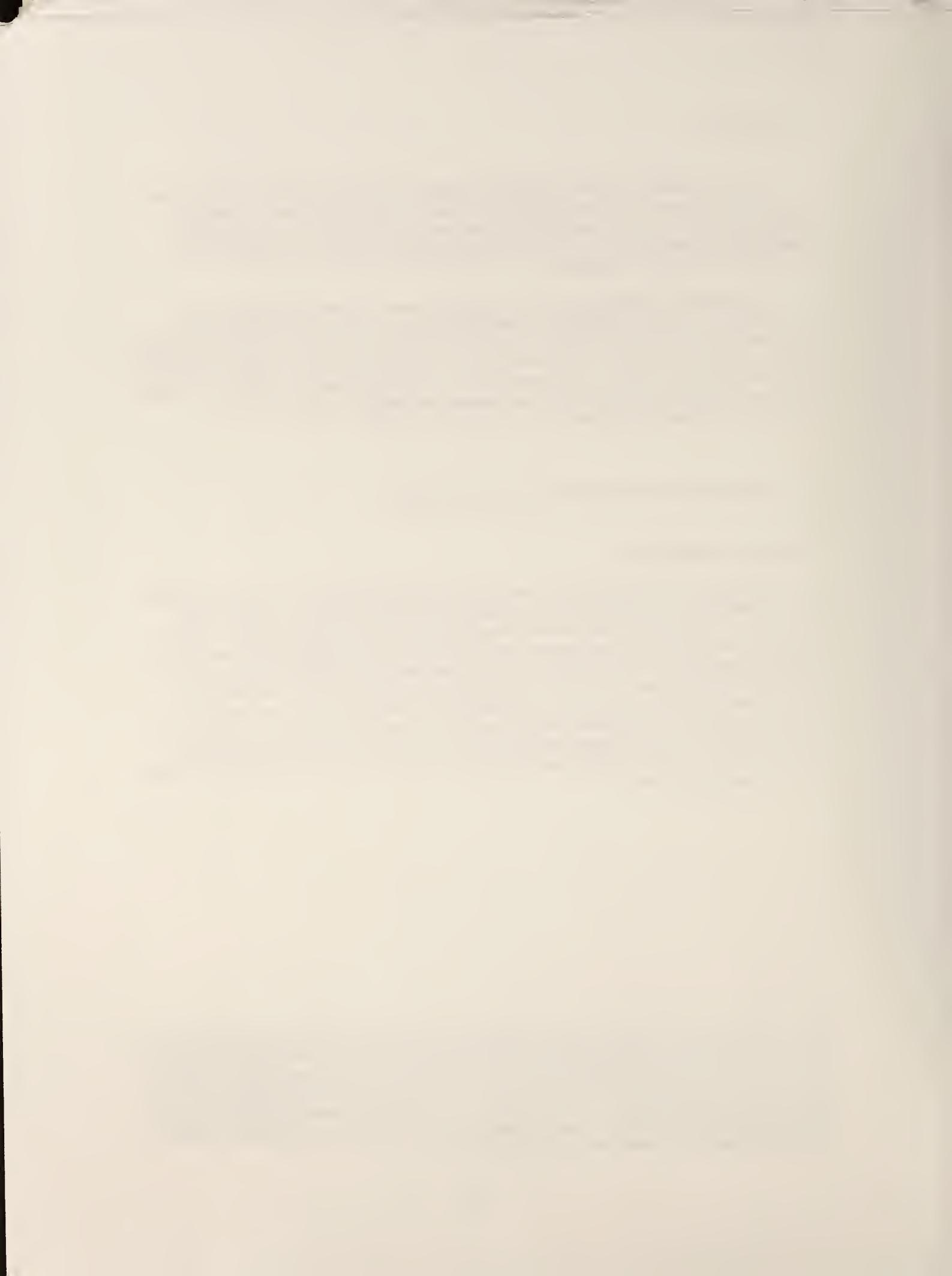
TABLE 15
UNADJUSTED HEALTH SCORES

HMO NUMBER	UNADJUSTED HEALTH STATUS MEAN	t WITH UNEQUAL VARIANCE	p of t	
11	6.45946	1.8888	0.0601	
12	6.56216	1.8916	0.0597	
13	6.82381	4.1807	0.0001	*
14	6.52000	3.9679	0.0001	*
15	6.69340	4.7049	0.0001	*
16	6.58744	2.2525	0.0252	
22	6.39086	2.8714	0.0044	*
23	6.37647	0.9750	0.3304	
24	6.60194	3.8535	0.0001	*
25	6.36126	2.6290	0.0091	*
26	6.05882	0.5290	0.5980	
27	6.43979	1.7247	0.0857	
33	6.71154	1.4101	0.1594	
34	6.82569	4.2089	0.0001	*
35	6.54271	3.6314	0.0003	*
36	6.92308	3.1895	0.0025	*
44	6.43810	2.2395	0.0258	
45	6.78327	2.0034	0.0458	
46	6.82857	3.4866	0.0008	*
47	6.25592	1.1951	0.2330	
48	6.51471	3.0614	0.0024	*
49	6.45320	2.2400	0.0258	
50	6.40541	1.4735	0.1419	

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* Statistically significant using modified Bonferroni correction to p-value
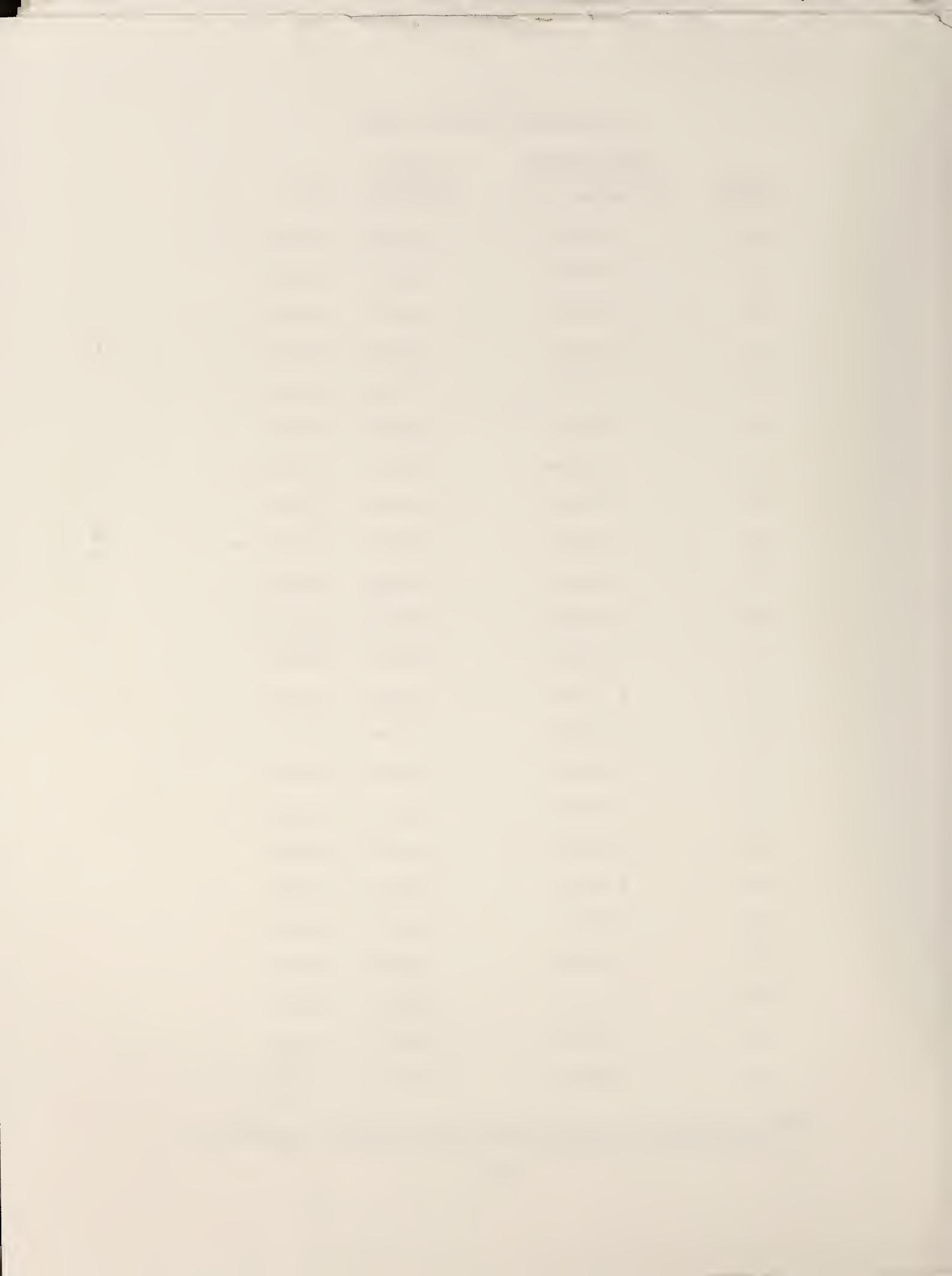
Age and Sex Distribution of Enrollee and Nonenrollee Respondents

HMOs with TEFRA risk contracts are paid according to the AAPCC formula, which includes adjustments for the age, sex, institutional status, and welfare status of the enrollees. Because the effect of these characteristics is addressed in the payment formula, differences in these characteristics between enrollees and nonenrollees must be taken into account when making judgments about selection bias. The age and sex distributions of the enrollee and comparison nonenrollee groups were examined, and significant differences in age for 14 HMOs were found, as was a significant difference in sex distribution for one HMO. Due to lack of data about the proportion of enrollees and nonenrollees who were institutionalized or who were on Medicaid, it was not possible to examine differences in these variables.

In Table 16, a summary of the comparisons of age between HMOs and the nonenrollee groups is presented. In all but one of the HMOs, the average age of the enrollees is less than the average age of the nonenrollees. In 16 of the HMOs, the p-value of the t-statistic for the difference in age is less than .05, and, using the modified Bonferroni correction, the enrollees in 14 of the HMOs are younger by a statistically significant margin.

Table 17 summarizes the comparisons of sex distributions between HMO enrollees and the nonenrollee groups. In 7 of the HMOs the enrollees had a higher percentage of males than the comparison group of nonenrollees, and in 16 of the HMOs the enrollees had a higher percentage of females than the comparison group of nonenrollees. However, the p-values of the t-statistics for the differences in sex composition were less than .05 in only 2 cases, and, using the modified Bonferroni correction, the difference was statistically significant in only one case.

Given the magnitude of the differences in the age distributions between enrollees and nonenrollees, and the fact that these differences are taken into account in the computation of the payment to the HMOs (the AAPCC), it was necessary to adjust the health scores for each of the enrollee and nonenrollee groups in the study, to remove the effects of age and sex on the results. If HMOs are attracting "healthier" enrollees than the general population of Medicare beneficiaries, but this is due to the younger average age of the enrollees, it is necessary to remove this confounding effect in order to be able to examine the direct relationship between HMO marketing variables and the health status of enrollees versus nonenrollees.
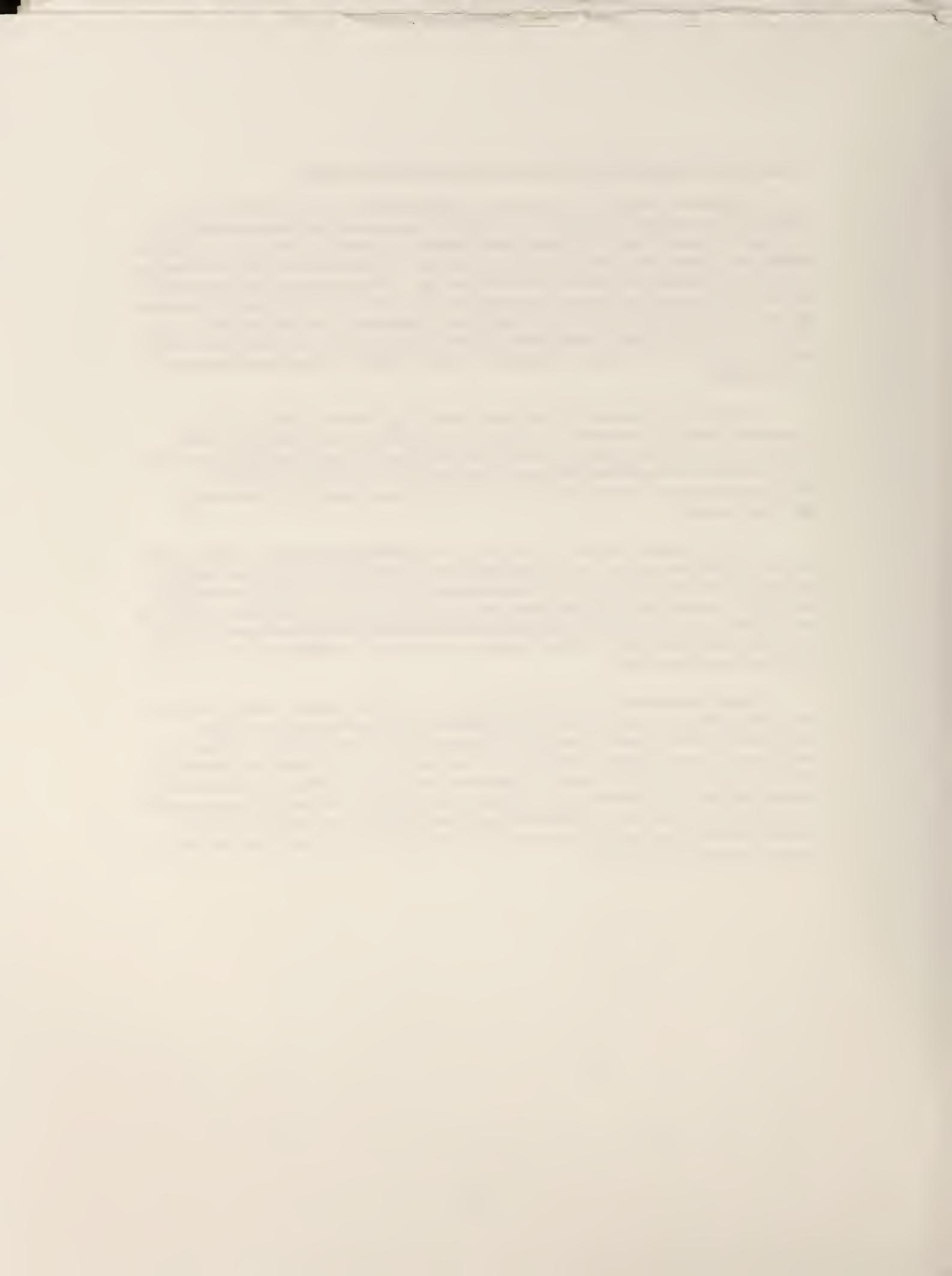
TABLE 16
COMPARISON OF AGE DISTRIBUTIONS

HMO NUMBER	DIRECTION @ OF DIFFERENCE	t WITH UNEQUAL VARIANCE	p of t	
11	-	1.6537	0.0992	
12	-	4.2310	0.0001	*
13	-	5.6353	0.0001	*
14	-	5.8009	0.0001	*
15	-	5.5935	0.0001	*
16	-	1.9381	0.0535	
22	-	3.2078	0.0015	*
23	-	2.6823	0.0078	*
24	-	3.0788	0.0023	*
25	-	2.2690	0.0241	*
26	-	3.3000	0.0014	*
27	-	2.0993	0.0366	
33	-	0.8727	0.3834	
34	-	4.4420	0.0001	*
35	-	1.6819	0.0937	
36	-	3.1518	0.0030	*
44	-	4.0930	0.0001	*
45	+	-0.4385	0.6612	
46	-	1.8514	0.0700	
47	-	5.4876	0.0001	*
48	-	3.9672	0.0001	*
49	-	2.3635	0.0187	
50	-	0.4050	0.6857	

@ - Enrollee mean age < nonenrollee mean age
 + Enrollee mean age > nonenrollee mean age
* Statistically significant using modified Bonferroni
  correction to p-value

TABLE 17
COMPARISON OF SEX DISTRIBUTIONS

HMO NUMBER	DIRECTION @ OF DIFFERENCE	t WITH UNEQUAL VARIANCE	p of t	
11	-	-0.8620	0.3894	
12	+	0.9857	0.3251	
13	-	-1.7382	0.0831	
14	+	1.3192	0.1881	
15	+	2.2833	0.0231	*
16	+	0.1589	0.8739	
22	+	0.7725	0.4705	
23	-	-0.6778	0.4985	
24	-	-1.0803	0.2809	
25	-	-0.6977	0.4859	
26	-	-1.3568	0.1782	
27	-	-1.1061	0.2696	
33	+	1.7482	0.0814	
34	-	-0.5744	0.5663	
35	-	-1.1256	0.2613	
36	-	-1.0070	0.3209	
44	-	-2.1197	0.0347	
45	-	-1.9406	0.0530	
46	-	-1.0333	0.3060	
47	+	0.9997	0.3182	
48	-	-0.9085	0.3643	
49	-	-0.3299	0.7417	
50	-	-1.4237	0.1556	

@ - Enrollees more female than nonenrollees
 + Enrollees more male than nonenrollees
* Statistically significant using modified Bonferroni
 correction to p-value

4.2. ADJUSTED HEALTH STATUS AND RELATIVE HEALTH INDICES

Results of Health Status Comparisons After Adjusting for Age and Sex

The health scores for each enrollee and nonenrollee group were adjusted to a standard age/sex distribution, the July 1, 1987 U.S. Bureau of the Census projections for the distribution of the age 65+ population in the U.S. (the July 1, 1988 projections were not available at the time of processing). These projections include individuals who are institutionalized, which is important given that, especially among the oldest age group, there may be a significant number of people in nursing homes.

In Table 18, we present a comparison of the unadjusted health scores and age/sex adjusted health scores for each HMO enrollee group and each city's nonenrollees. In all cases, the adjusted mean health score for each enrollee group is lower than the unadjusted mean health score. Among the nonenrollee groups, the adjustment increased the mean health score in 6 cities, and decreased the mean health score in 7 cities. Standardization had the effect of decreasing the differences in health status between enrollee and nonenrollee groups.

Test of Differences in Adjusted Mean Health Scores - Enrollees v. Nonenrollees

As described in Section 3.4.1., several methods were used to examine the differences between adjusted enrollee and nonenrollee mean health scores. The first method used was a t-test. Because the means used in this test have already been adjusted to a standard age and sex distribution, this comparison between enrollees in each HMO and the associated nonenrollees accounts for the interaction of age and sex in the computation of the t statistic and the associated p-value.

The t statistics (labelled "t(1)") and p-values for the 23 HMOs are presented in Table 19. The p-values of the differences in adjusted health status were less than .05 in 10 cases, and using the modified Bonferroni correction yielded 7 cases with statistically significant differences. Thus, 7 HMOs were found to have experienced favorable selection using this method, none were found to have experienced adverse selection, and 16 were not statistically different from the comparison group. [2]

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[2] Since institutionalization is more likely to occur among the older nonenrollee group than among the younger enrollee group, and the response rate was lower among nonenrollees, there is the potential that the effect on mean health status of the sicker institutionalized nonenrollees is being underestimated. Thus, the difference in health status between enrollees and nonenrollees might even be slightly greater than we estimated. It should be noted that we have no data on the rate of institutionalization among enrollee and nonenrollee groups.
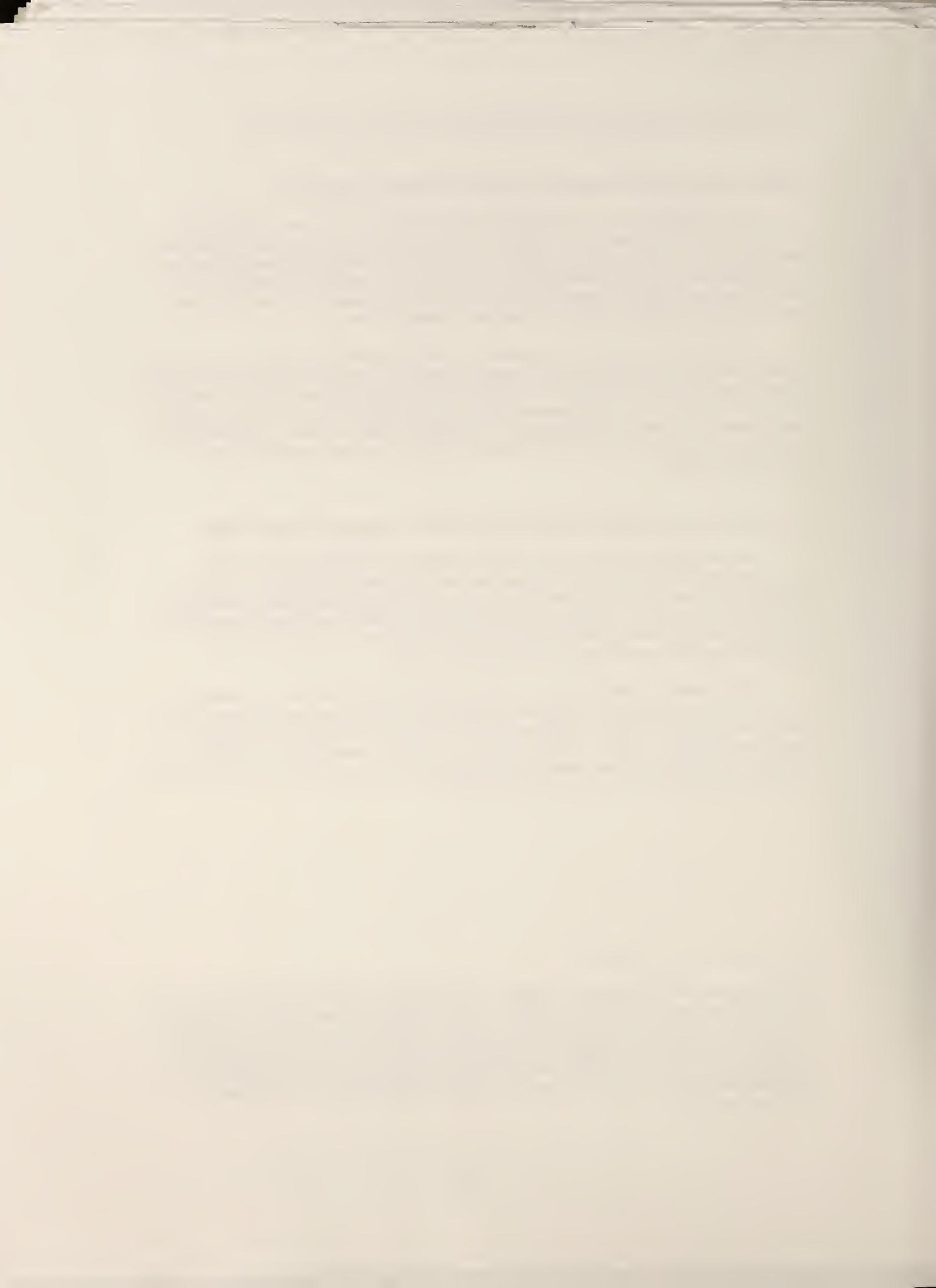
TABLE 18
UNADJUSTED AND ADJUSTED HEALTH SCORES

| HMO NUMBER | UNADJUSTED HEALTH STATUS | | ADJUSTED HEALTH STATUS | |
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
11	6.45946	1.668027	6.40350	1.636704
12	6.56216	1.680345	6.42808	1.872217
13	6.82381	1.572005	6.51387	1.952683
14	6.52000	1.715792	6.17050	2.333158
15	6.69340	1.633579	6.50886	2.099955
16	6.58744	1.798454	6.42911	1.904376
22	6.39086	1.836289	6.06234	2.094985
23	6.37647	1.861961	6.33545	1.912250
24	6.60194	1.825776	6.30454	2.021388
25	6.36126	1.815247	6.32125	1.760228
26	6.05882	1.994109	5.80278	2.849466
27	6.43979	1.934531	6.23511	2.277873
33	6.71154	1.646147	6.57942	1.858157
34	6.82569	1.502122	6.56276	1.947110
35	6.54271	1.725312	6.45658	1.885665
36	6.92308	1.412036	6.65930	1.493943
44	6.43810	1.800711	6.15065	1.980500
45	6.78327	1.642292	6.70362	1.542262
46	6.82857	1.484938	6.79893	1.590711
47	6.25592	1.932405	6.00924	2.678078
48	6.51471	1.614216	6.24026	1.799980
49	6.45320	1.932404	6.27332	2.089624
50	6.40541	1.831738	6.37759	1.785848

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CITY NUMBER	UNADJUSTED HEALTH STATUS		ADJUSTED HEALTH STATUS	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
11	5.69343	2.112853	5.78781	1.870589
12	5.88080	2.132064	5.87129	2.155766
13	5.99296	2.088457	6.06376	1.732622
14	5.75000	2.139471	5.71789	2.429477
15	6.44608	1.920087	6.33695	1.887392
16	5.66443	2.309237	5.63772	2.255962
17	5.75887	2.229352	5.90382	2.047541
18	6.03571	2.222872	6.01885	2.180809
19	6.15556	2.043799	6.17997	1.878285
20	5.87943	2.284967	5.88636	2.170995
21	5.95152	2.289440	5.91415	2.061858
22	5.82203	2.065721	5.90747	1.870800
23	6.05556	2.437406	5.93756	2.379842

TABLE 19
RESULTS OF TEST OF SIMPLE MEANS
ENROLLEE vs. NONENROLLEE HEALTH STATUS

HMO NUMBER	MEAN	t(1)	p of t(1)	
11	6.40350	1.747	0.0818	
12	6.42808	1.169	0.2435	
13	6.51387	2.862	0.0045	*
14	6.17050	2.294	0.0225	*
15	6.50886	3.349	0.0009	*
16	6.42911	2.085	0.0381	
22	6.06234	1.357	0.1759	
23	6.33545	0.712	0.4769	
24	6.30454	2.356	0.0192	
25	6.32125	1.947	0.0525	
26	5.80278	-0.190	0.8495	
27	6.23511	0.875	0.3825	
33	6.57942	1.219	0.2239	
34	6.56276	2.581	0.0105	*
35	6.45658	3.015	0.0028	*
36	6.65930	2.308	0.0257	
44	6.15065	1.122	0.2627	
45	6.70362	2.252	0.0249	*
46	6.79893	3.195	0.0020	*
47	6.00924	-0.232	0.8165	
48	6.24026	1.708	0.0886	
49	6.27332	1.651	0.0994	
50	6.37759	1.899	0.0587	

* Statistically significant using modified Bonferroni
correction to p-value

Results of Regression

As described in Section 3.4.1., we also conducted Ordinary Least Squares regressions to test for relationships between health status (the dependent variable) and age, sex, enrollment status, and interactions between these variables. Four different regression models were tested. No significant interactions were found, and therefore interaction terms are not included in the regression results presented here.

Results of the regressions using Model 4 are presented in Table 20. Using this model, the issue of selection bias is represented by the coefficient of the variable indicating enrollment/non-enrollment. That is, controlling for age and sex, this variable indicates whether enrollment / nonenrollment has a significant relationship to health status.

Table 20 shows the t-value associated with the hypothesis test that the coefficient of the enrollment decision variable was equal to zero (labelled "t(2)") and the associated p-value for each HMO. The p-value was less than .05 in 13 cases, and using the modified Bonferroni correction, statistically significant differences were found in 8 cases - all in the direction of favorable selection for the HMOs.

Creation of a Dichotomous Health Status Variable

After performing the t-tests of means and the regression analyses of the relationships between health status and enrollment, a summary measure of the risk selection experienced by the HMOs in the study was created. It had originally been hypothesized that some HMOs would experience adverse selection, others would have neutral selection, and some would have favorable selection, leading to a summary variable with levels of -1, 0, and +1. However, none of the HMOs in this study experienced adverse selection. Therefore, a dichotomous variable with levels 0 and 1 to represent "no significant risk selection" and "significant favorable selection" was created.

To determine how to use the test results in assigning HMOs to level 0 and level 1 of this variable, the results of the simple tests of means, t(1), were compared with the results of the regression, t(2). An advantage of using the results of the t(1) test is that, because the health status means of each group were adjusted to a standard age/sex distribution, the effects of age and sex are taken into account in these tests. Regression, represented by t(2), is an alternative method of measuring the relationship between health status and enrollment that may be more familiar to some readers.

Six of the 8 HMOs with statistically significant results on the regression t(2) also have statistically significant results on t(1). The ninth HMO which is statistically significant on t(1) (HMO #45), but not significant on t(2), is just outside the significance level prescribed by the modified Bonferroni significance level, on the t(2) analysis (p-value for

TABLE 20
RESULTS OF REGRESSION

HMO NUMBER	COEFFICIENT FOR ENROLLMENT VARIABLE	t(2)	p of t(2)	
11	0.35886	1.708	0.0886	
12	0.16402	0.808	0.4197	
13	0.54201	2.812	0.0052	*
14	0.49535	2.536	0.0116	*
15	0.61161	3.023	0.0027	*
16	0.41161	2.012	0.0450	
22	0.41255	2.026	0.0435	
23	0.16972	0.781	0.4353	
24	0.66330	3.383	0.0008	*
25	0.49443	2.336	0.0201	*
26	-0.21999	-0.598	0.5508	
27	0.27911	1.285	0.1998	
33	0.22154	1.181	0.2383	
34	0.63556	2.705	0.0074	*
35	0.77442	3.826	0.0002	*
36	0.69399	1.659	0.0989	
44	0.24069	1.227	0.2204	
45	0.34932	2.224	0.0266	
46	0.98119	2.633	0.0092	*
47	-0.13235	-0.620	0.5356	
48	0.37674	1.981	0.0484	
49	0.34168	1.710	0.0881	
50	0.40570	1.973	0.0493	

* Statistically significant using modified Bonferroni correction to p-value

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the t(1) test is .0249, p-value on t(2) test is .0266). It was therefore decided to include all 9 HMOs in the favorable selection group.

Neither regression nor comparison of means is a clearly more acceptable method of examining relationships between health status and enrollment. Further, the results of these methods converge to the same set of HMOs with the only differences between the two methods falling just outside the statistical standard established for significance. Based on the results of these two methods, it was concluded that there are 9 HMOs with significantly healthier enrollees, and 14 with enrollees that are not significantly different from their nonenrollees. No HMOs experienced adverse selection.

In Table 21, the HMOs determined to have neutral or favorable selection based on the results of t(1), t(2) and the combination of the t(1) and t(2) tests are presented.

Creation of Relative Health Indices

As the pattern of respondent health status scores was examined, it became apparent that the distribution of health scores was skewed. Of the total of 6,041 respondents, age 65 and older, for whom health scores were calculated, 2,334 (38.6%) had a health score of 8 (the highest score), and 348 (5.8%) had health scores of 2 or less. Individuals in the "healthy tail" of the health score distribution are important because they may be very inexpensive to care for, and individuals in the "sick tail" are important because they may be very costly for the HMO to care for. Because the tests of means and the regression analyses discussed previously focus on the central tendency of the distributions and do not focus on the tails, two Relative Health Indices were created which would examine the tails of the distributions: a Relative High Health Index (RHHI) and a Relative Low Health Index (RLHI). Both of these indices are adjusted for the age and sex distribution of the groups (see Section 3.4.1.). The formulas used to compute these indices are presented in Figure 2.[3]

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[3]The Relative Health Indices are odds ratios. When making inferences using odds ratios, it is common to transform to a logarithmic scale. However, in this study the natural scale is that of the odds ratio itself. A logarithmic scale would make interpretation of study findings much more difficult. A limited number of analyses were conducted on the logarithmic scale and compared to those shown here. There were no differences in conclusions between the two scales. Therefore, a transformation to a logarithmic scale is not used. Further, because each of the Relative Health Indices are estimated based on large sample sizes, it is assumed that the estimated indices are approximately normal in distirbution. The 95% confidence intervals are based on this assumption of large sample normality.

TABLE 21
DICHOTOMOUS HEALTH STATUS VARIABLE

HMO NUMBER	p of t(1)	SIG on t(1)	p of t(2)	SIG on t(2)	COMBINED SIGNIFICANCE
11	0.0818		0.0886		
12	0.2435		0.4197		
13	0.0045	*	0.0052	*	**
14	0.0225	*	0.0116	*	**
15	0.0009	*	0.0027	*	**
16	0.0381		0.0450		
22	0.1759		0.0435		
23	0.4769		0.4353		
24	0.0192		0.0008	*	**
25	0.0525		0.0201	*	**
26	0.8495		0.5508		
27	0.3825		0.1998		
33	0.2239		0.2383		
34	0.0105	*	0.0074	*	**
35	0.0028	*	0.0002	*	**
36	0.0257		0.0989		
44	0.2627		0.2204		
45	0.0249	*	0.0266		**
46	0.0020	*	0.0092	*	**
47	0.8165		0.5356		
48	0.0886		0.0484		
49	0.0994		0.0881		
50	0.0587		0.0493		

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* Statistically significant using modified Bonferroni
  correction to p-value
** Significant using Union of t(1) and t(2) results

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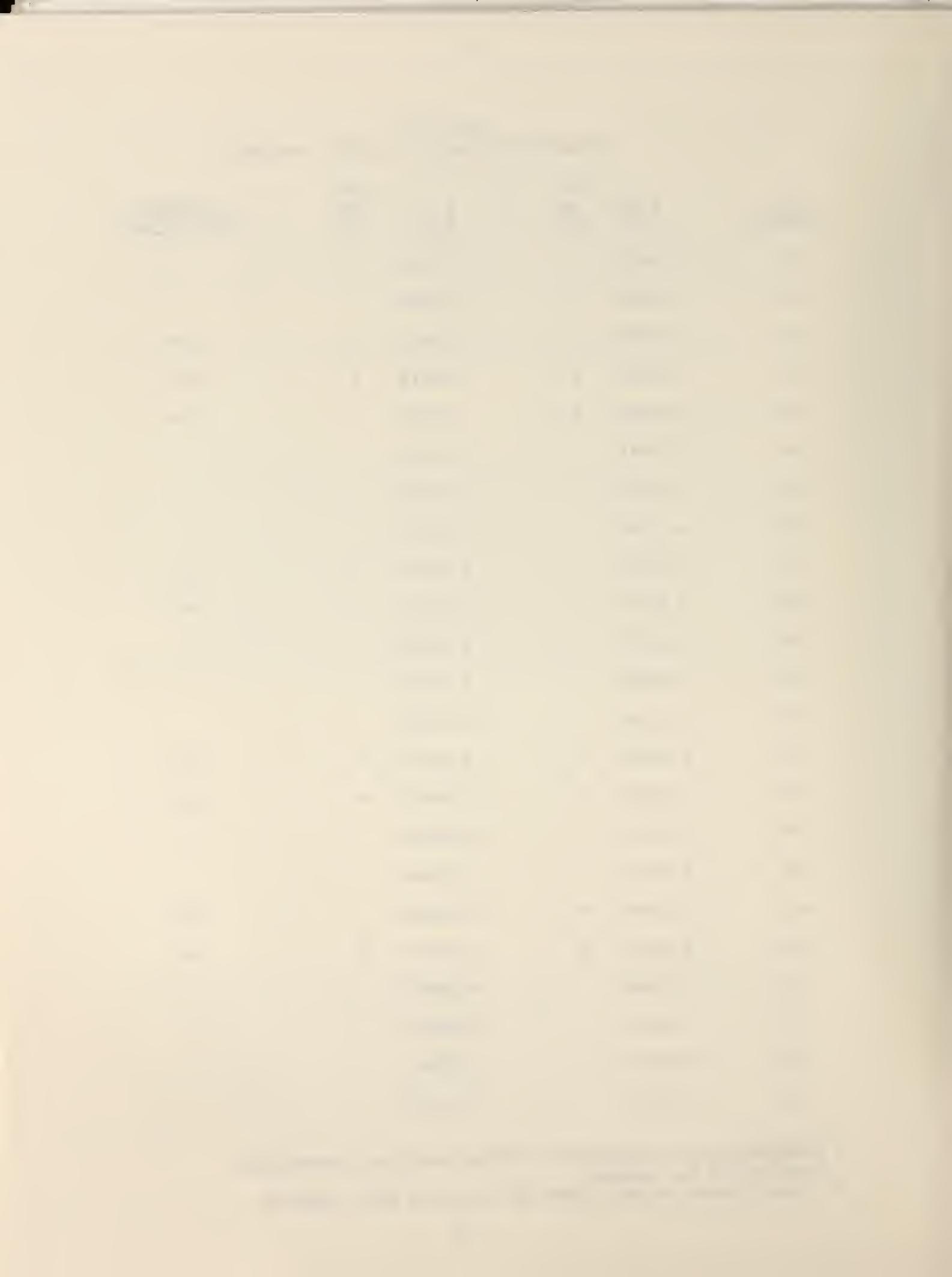
Figure 2

Creation of Relative Low Health Index *

$$\frac{\frac{\text{Number of enrollees with}}{\underline{\text{health scores of 0 through 4}}}}{\text{Number of enrollees with} \atop \text{health scores of 5 through 8}}$$

$$\frac{\frac{\text{Number of nonenrollees with}}{\underline{\text{health scores of 0 through 4}}}}{\text{Number of nonenrollees with} \atop \text{health scores of 5 through 8}}$$

*This index is age- and sex-adjusted.

Creation of Relative High Health Index *

$$\frac{\frac{\text{Number of enrollees with}}{\underline{\text{health scores of 7 or 8}}}}{\text{Number of enrollees with} \atop \text{health scores of 0 through 6}}$$

$$\frac{\frac{\text{Number of nonenrollees with}}{\underline{\text{health scores of 7 or 8}}}}{\text{Number of nonenrollees with} \atop \text{health scores of 0 through 6}}$$

*This index is age- and sex-adjusted.

The RHHI compares the ratio of the enrollee population with health scores of 7 or 8 (very healthy), versus enrollees with health scores of 0 through 6 (in poorer health), with this same ratio for the relevant nonenrollee group. To the extent that an HMO is enrolling proportionately more individuals with high health than exist in the community at large, the RHHI will be greater than 1. Conversely, if an HMO enrolls proportionately fewer individuals with high health than exist in the community at large, the RHHI will be less than 1.

The RLHI compares the ratio of the enrollee population with health scores of 0 through 4 (these levels roughly correspond to the Activities of Daily Living functional health questions), versus enrollees with health scores of 5 through 8, with this same ratio for the relevant non-enrollee group. An HMO that is enrolling proportionately fewer very sick people will have a RLHI of less than 1, and an HMO that is enrolling proportionately more very sick people will have a ratio of greater than 1.

The results of the computations of RHHIs and RLHIs and 95% Confidence Intervals (developed using a Taylor Series approximation) for the 23 HMOs in the study are presented in Table 22. The RHHIs range from 0.93106 to 2.63502. The RHHIs range from 0.931106 to 2.63502. Although 4 HMOs have RHHI values which suggest adverse selection, in each case the confidence interval around the estimate includes 1.0, indicating that HMO enrollees are not significantly different from the comparison group of non-enrollees. In all, neutral selection at the high end of the health status distribution is indicated for 12 HMOs, since their RHHI confidence intervals include 1.0. Favorable selection, in terms of high health odds, is indicated for 11 other HMOs, since they each show RHHI values significantly greater than 1.0. No HMO experienced adverse selection on the high end of the health status scale.

RLHI values range from 0.118 to 1.117. Index values for two of the HMOs are greater than 1.0, suggesting adverse selection of very disabled enrollees. However, in both cases the 95 percent confidence intervals include 1.0, indicating no significant difference between enrollees and non-enrollees; i.e., neutral selection. Focusing on the very disabled Medicare beneficiaries, five of the HMOs experienced neutral selection, and 18 favorable selection. Again, no HMO experienced adverse selection on this measure.

Table 23 compares the risk selection results computed for each HMO, using the dichotomous health status variable and the Relative Health Indices. Of the 9 HMOs with favorable selection as defined for the dichotomous health status variable, 8 also have RHHI confidence limits which do not include 1.00, i.e., the entire C.I. is above 1.00. All 9 also have RLHI confidence limits which do not include 1.00, i.e., the entire C.I. is below 1.00. There are also two HMOs (HMO #22 and HMO #49) in which both Relative Health Index confidence limits do not include 1.00, but which are not defined as having favorable selection for the dichotomous health status variable.

TABLE 22
RELATIVE HEALTH INDICES

HMO NUMBER	RELATIVE HIGH HEALTH INDEX					RELATIVE LOW HEALTH INDEX				
	INDEX	STANDARD ERROR	RANK	C.I. LIMITS Upper	Lower	INDEX	STANDARD ERROR	RANK	C.I. LIMITS Upper	Lower
11	1.05431	0.079389	16	1.20991	0.89871	0.72740	0.075853	15	0.87607	0.57873
12	1.12434	0.082225	13	1.28550	0.96318	0.75276	0.080090	17	0.90974	0.59578
13	1.46468	0.099750	6	1.66019	1.26917	0.45014	0.046242	4	0.54077	0.35951
14	1.25010	0.088859	10	1.42426	1.07594	0.61841	0.060625	13	0.73724	0.49958
15	2.54038	0.202635	2	2.93754	2.14322	0.52079	0.051896	9	0.62251	0.41907
16	1.13635	0.078296	12	1.28981	0.98289	0.50836	0.051597	7	0.60949	0.40723
22	1.21941	0.095309	11	1.40622	1.03260	0.74647	0.077525	16	0.89842	0.59452
23	1.04835	0.079218	18	1.20362	0.89308	0.89398	0.094244	19	1.07870	0.70926
24	1.87598	0.141287	3	2.15290	1.59906	0.59692	0.062002	11	0.71844	0.47540
25	1.42553	0.112376	7	1.64579	1.20527	0.79401	0.077772	18	0.94644	0.64158
26	0.94997	0.108193	21	1.16203	0.73791	0.99936	0.158444	21	1.30991	0.68881
27	1.25995	0.091519	9	1.43933	1.08057	1.11714	0.118214	23	1.34884	0.88544
33	0.93414	0.060956	22	1.05361	0.81467	0.58247	0.061634	10	0.70327	0.46167
34	1.51425	0.132626	5	1.77420	1.25430	0.51466	0.071102	8	0.65402	0.37530
35	1.78791	0.137024	4	2.05648	1.51934	0.45721	0.046282	5	0.54792	0.36650
36	0.93106	0.128237	23	1.18240	0.67972	0.11811	0.023966	1	0.16508	0.07114
44	1.09532	0.077084	15	1.24640	0.94424	1.04459	0.102467	22	1.24543	0.84375
45	1.11848	0.062574	14	1.24113	0.99583	0.60928	0.054879	12	0.71684	0.50172
46	2.63502	0.303721	1	3.23031	2.03973	0.23851	0.039970	2	0.31685	0.16017
47	0.97283	0.073384	20	1.11666	0.82900	0.93144	0.093709	20	1.11511	0.74777
48	1.02789	0.076878	19	1.17857	0.87721	0.42615	0.043935	3	0.51226	0.34004
49	1.34543	0.094455	8	1.53056	1.16030	0.63064	0.063549	14	0.75520	0.50608
50	1.05100	0.074041	17	1.19612	0.90588	0.50720	0.050653	6	0.60648	0.40792

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TABLE 23
COMPARISON OF RISK SELECTION AS MEASURED BY
DICHOTOMOUS HEALTH STATUS VARIABLE AND RELATIVE RISK INDICES

HMO NUMBER	DICHOTOMOUS HEALTH STATUS VARIABLE	REL. RISK INDICES CONFIDENCE INTERVALS	
		R.H.H.I. excludes 1.00 (a)	R.L.H.I. excludes 1.00 (b)
11		no	YES
12		no	YES
13	**	YES	YES
14	**	YES	YES
15	**	YES	YES
16		no	YES
22		YES	YES
23		no	no
24	**	YES	YES
25	**	YES	YES
26		no	no
27		YES	no
33		no	YES
34	**	YES	YES
35	**	YES	YES
36		no	YES
44		no	no
45	**	no	YES
46	**	YES	YES
47		no	no
48		no	YES
49		YES	YES
50		no	YES

** Significant using Union of t(1) and t(2) results
(a) Both Upper and Lower bounds of C.I. are greater than 1.00
(b) Both Upper and Lower bounds of C.I. are less than 1.00

The variation in the risk selection measures which can be seen when comparing the dichotomous health status variable and the Relative Health Indices suggests that not only a measure of the differences in means, but also some measure comparing the distribution of health status of enrollees versus non-enrollees, may be important variables in studies of the presence of risk selection. In the analyses of the relationship between marketing and risk selection, whose results are presented in Section 4.5, three measures of risk selection will be used. These will be the difference in mean health status between each enrollee group and its comparison nonenrollee group (a measure of central tendency), the Relative Low Health Index, and the Relative High Health Index (the latter two are measures of the tails of the distribution). In the analyses of the relationship between content of promotional materials and risk selection, whose results are presented in Section 4.7., the dichotomous health status variable, a measure based upon the distribution's central tendency, will be used.

4.3. SALIENCE VARIABLES AND RELATIONSHIP TO HEALTH STATUS

The beneficiary survey instrument contained a set of questions designed to measure the salience (importance) to the respondents of a number of features of health care. A list of the features included in the salience section of the survey instrument is presented in Table 7 in Section 3.2.4. Respondents were asked to rate the importance of each feature along a 7-point scale from "Absolutely Necessary" (scale level 7) to "Not Very Important" (scale level 1).

For analysis purposes, two summary salience measures were created. For each group of enrollees and nonenrollees, the proportion of respondents who rated a feature as Absolutely Necessary (6 or 7 on the scale of 1 to 7) was computed. In addition, for enrollees and for nonenrollees in each of the market areas, the average rating for each feature was computed by level of respondent health score.

"Absolutely Necessary" Ratings

For enrollees in each of the 23 HMOs, and for nonenrollees in each of the 13 market areas, the proportion of respondents who rated a feature as "Absolutely Necessary" (ratings of 6 or 7 on the scale of 1 to 7) was computed. Table 24 presents descriptive results of this computation, by HMO and market area. Two striking findings can be seen in this Table: 1) The feature rated as Absolutely Necessary by the highest proportion of enrollees in every HMO and nonenrollees in every market area was stability. 2) Nonenrollees rated choice of hospital and choice of doctor as Absolutely Necessary to a much greater extent than did enrollees. The proportion of nonenrollees rating choice of hospital as Absolutely Necessary ranged from 42% to 61% (while the proportion of enrollees rating choice of hospital as Absolutely Necessary ranged from 13% to 42%). Likewise, the proportion of nonenrollees rating choice of doctor as Absolutely Necessary ranged from 41% to 63% (while the proportion of enrollees rating choice of doctor as Absolutely Necessary ranged from 15% to 39%).

Table 25 presents the same data summarized by model type for HMO enrollees, for all HMO enrollees as a group, and for all nonenrollees. The same overall patterns of responses are apparent: stability is rated as Absolutely Necessary more frequently than any other feature by both enrollees in any model HMO and nonenrollees. Choice of hospital and choice of doctor are rated as Absolutely Necessary by 50% of the nonenrollees altogether, placing these choice features in 2nd and 3rd place. Only 25% of enrollees rate these choice features as Absolutely Necessary, placing these choice features in 9th and 10th place.

It is also interesting to examine the responses for enrollees by the HMO model they joined. The proportions of Absolutely Necessary responses, for each feature, tend to be very similar, and the rank order of the features also tends to be very similar. One exception occurs with respect to Choice of Hospital and Choice of Doctor: while 28% of IPA enrollees rated these two features as Absolutely Necessary, a smaller proportion of Group/Staff enrollees (21% for Choice of Hospital, 20% for Choice of Doctor) rated the
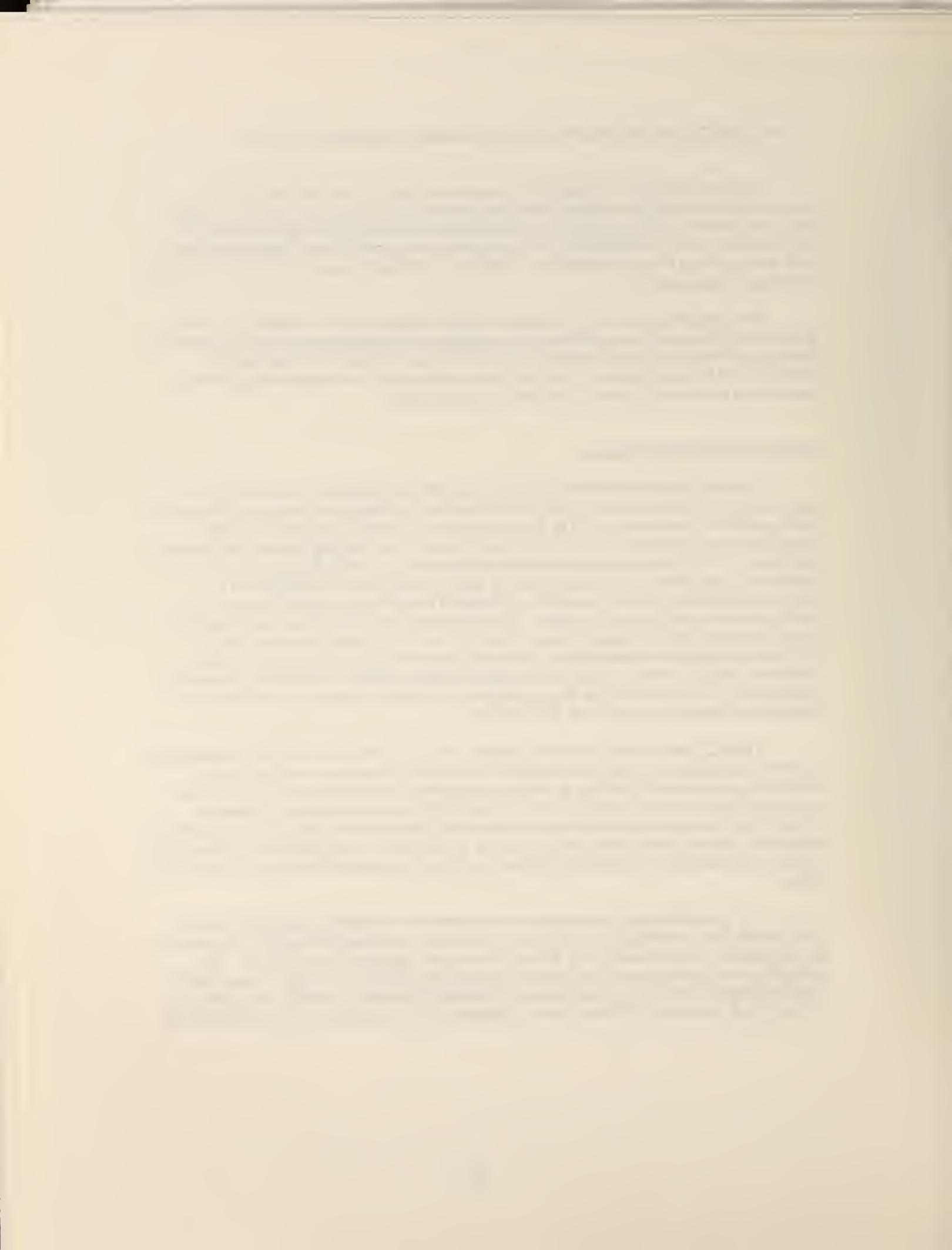
TABLE 24
ABSOLUTELY NECESSARY SALIENCE RESPONSES
ENROLLEES, BY HMO

HMO Number	STABILITY % Abs. Nec.	Rank	SNF % Abs. Nec.	Rank	UNLTD. HOSP % Abs. Nec.	Rank	COVER BILLS % Abs. Nec.	Rank	SPECIALIST % Abs. Nec.	Rank	ROUTINE PHYS % Abs. Nec.	Rank
11	72	1	55	3	59	2	52	4	50	5	46	6
12	69	1	56	3	61	2	54	5	56	4	46	6
13	72	1	48	4	49	3	47	5	59	2	38	7
14	75	1	63	2	57	4	56	5	51	7	58	3
15	66	1	54	2	53	3	50	4	49	6	50	5
16	76	1	57	2	55	3	54	4	48	5	43	6
22	71	1	57	2	56	3	55	4	48	7	50	5
23	71	1	57	3	60	2	55	4	51	5	48	6
24	66	1	50	4	54	2	51	3	49	5	47	6
25	73	1	55	2	52	3	44	5	45	4	42	6
26	71	1	58	2	40	7	57	3	47	5	56	4
27	75	1	54	3	48	4	57	2	46	5	44	6
33	70	1	44	3	42	4	39	5	45	2	30	6
34	66	1	48	2	47	3	43	5	44	4	42	6
35	74	1	54	6	55	5	59	2	55	4	55	3
36	96	1	62	2	58	3	50	6	54	5	42	8
44	65	1	40	5	42	4	45	2	44	3	37	6
45	71	1	46	3	44	5	45	4	53	2	35	6
46	61	1	45	5	47	3	55	2	47	3	32	9
47	69	1	58	3	60	2	53	5	51	7	51	6
48	74	1	56	3	54	5	56	2	54	4	45	7
49	67	1	51	2	50	3	41	6	43	5	44	4
50	70	1	51	2	48	4	47	5	49	3	37	7

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HMO Number	MIN. PAPER % Abs. Nec.	Rank	DRUGS % Abs. Nec.	Rank	CHOICE HOSP % Abs. Nec.	Rank	CHOICE DOC % Abs. Nec.	Rank	CONV. LOC. % Abs. Nec.	Rank
11	39	7	30	9	31	8	30	10	23	11
12	31	10	43	7	35	8	32	9	20	11
13	36	8	29	10	32	9	39	6	17	11
14	52	6	45	8	20	10	20	11	25	9
15	36	7	36	8	30	9	28	10	17	11
16	35	7	27	8	18	10	20	9	18	11
22	49	6	31	8	29	9	29	10	26	11
23	37	9	48	7	36	10	38	8	26	11
24	43	7	34	8	20	10	18	11	20	9
25	35	7	28	9	29	8	26	10	15	11
26	46	6	40	8	32	9	32	?	17	11
27	36	7	34	8	19	11	20	10	21	9
33	28	7	25	8	13	10	15	9	10	11
34	34	8	39	7	19	10	19	11	21	9
35	42	8	49	7	27	9	25	11	26	10
36	58	3	38	10	42	8	27	11	44	7
44	33	7	21	10	26	8	24	9	15	11
45	32	7	28	8	21	10	21	9	17	11
46	42	6	39	7	39	7	29	10	24	11
47	42	8	54	4	26	10	24	11	28	9
48	40	8	48	6	18	10	19	9	17	11
49	36	7	26	9	25	10	26	8	17	11
50	47	5	25	8	25	9	22	10	17	11

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City Number	STABILITY % Abs. Nec.	Rank	SNF % Abs. Nec.	Rank	UNLTD. HOSP % Abs. Nec.	Rank	COVER BILLS % Abs. Nec.	Rank	SPECIALIST % Abs. Nec.	Rank	ROUTINE PHYS % Abs. Nec.	Rank
11	69	1	60	2	55	4	55	5	45	8	47	7
12	66	1	43	6	45	5	42	7	45	4	37	8
13	62	1	48	3	46	6	44	7	47	4	35	9
14	67	1	47	4	49	2	44	6	43	7	31	9
15	74	1	53	5	40	7	46	6	53	4	28	9
16	72	1	56	2	52	5	51	7	52	5	42	8
17	63	1	49	2	42	6	43	5	46	3	32	8
18	66	1	44	6	43	7	45	5	51	2	30	9
19	71	1	58	4	49	6	43	7	51	5	37	8
20	68	1	44	6	40	7	44	5	46	4	30	10
21	58	1	45	3	43	5	44	4	51	2	32	10
22	69	1	57	2	50	7	55	3	52	5	41	9
23	58	1	38	5	36	7	39	4	37	6	27	9

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City Number	MIN. PAPER % Abs. Nec.	Rank	DRUGS % Abs. Nec.	Rank	CHOICE HOSP % Abs. Nec.	Rank	CHOICE DOC % Abs. Nec.	Rank	CONV. LOC. % Abs. Nec.	Rank
11	33	10	40	9	55	3	53	6	25	11
12	33	10	34	9	47	2	46	3	19	11
13	34	10	41	8	47	5	49	2	20	11
14	28	10	33	8	48	3	46	5	23	11
15	26	10	35	8	56	2	55	3	19	11
16	42	9	40	10	53	3	53	3	21	11
17	32	8	32	10	43	4	39	7	22	11
18	22	10	37	8	49	4	50	3	19	11
19	30	10	34	9	61	3	63	2	18	11
20	36	8	34	9	53	2	50	3	20	11
21	32	9	33	8	43	6	41	7	21	11
22	35	11	50	7	51	6	55	3	37	10
23	29	8	25	10	42	3	47	2	17	11

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TABLE 25
ABSOLUTELY NECESSARY SALIENCE RESPONSES
ENROLLEES BY MODEL TYPE, AND ALL NONENROLLEES

Feature	GROUP/STAFF % Abs. Nec.	Rank	IPA % Abs. Nec.	Rank	MIXED % Abs. Nec.	Rank	ALL ENROLLEES %Abs. Nec.	Rank	ALL NONENROLLEES % Abs. Nec.	Rank
Stability	71	1	73	1	70	1	72	1	72	1
Skilled Nurs. Facility	54	2	53	2	51	2	53	2	49	4
Unltd. hosp. days	53	3	52	3	51	3	52	3	45	7
Cover bills	52	4	48	5	50	4	50	4	46	6
Specialist	51	5	51	4	56	5	50	5	48	5
Routine phys. exams	49	6	52	6	44	6	45	6	34	9
Min. paperwk	41	8	37	7	39	7	39	7	31	10
Drug coverage	43	7	33	8	28	8	35	8	36	8
Choice of hospital	21	10	28	9	26	9	25	9	50	2
Choice of doctor	20	11	28	10	26	10	25	10	50	3
Convenient location	22	9	18	11	21	11	20	11	21	11

features as Absolutely Necessary. This result could be due to self-selection - individuals who attach greater salience to choice features tend to enroll in plans which offer greater choice (more likely to be a feature of IPAs), while individuals who attach lower salience to these features are attracted to Group and Staff (typically closed panel) HMOs. A higher proportion of Group/Staff enrollees tended to rate drug coverage as Absolutely Necessary than did enrollees in other model HMOs - this probably reflects the fact that, among the study HMOs, Group and Staff model HMOs were more likely to offer drug coverage.

Relationship between Health Status and Salience

It was originally hypothesized that there would be a relationship between an individual's health status and the salience that the individual assigns to certain features of health care (e.g., drug coverage would be more important to sicker people). If a relationship between health status and salience were found to exist, and if beneficiaries choose to enroll or not to enroll based on these salience characteristics, it would be expected that "self selection" on the basis of health status might occur. An HMO which offered benefits that were highly salient to less healthy individuals might experience adverse selection: less healthy individuals would "self-select" that HMO. Conversely, an HMO which offered benefits that were highly salient to healthier individuals might experience favorable selection.

This issue was investigated by comparing the mean salience score for the various features of health care across three categories of health. Respondents were classified as "healthy" (health scores of 7 or 8), of "medium health" (health scores of 5 or 6), or "unhealthy" (health scores of 0 through 4). These three categories correspond to the categories used in computing the Relative Health Indices.

Comparisons of the mean salience scores for each health status category were made for enrollees and nonenrollees in each city. T-tests for significant differences in means were conducted (p-value of t-statistic less than .05). Table 26 shows, for each city, which features were significantly more salient to nonenrollees than to enrollees, by health category. Table 27 shows, for each city, which features were significantly more salient to enrollees than to nonenrollees. The most obvious result is that, regardless of health status, the choice of hospital and the choice of doctor are significantly more salient to nonenrollees than to enrollees. Few other features consistently appear to be more salient to nonenrollees.

It can be seen from Table 27 that a variety of features are significantly more important to enrollees than to nonenrollees, especially among the healthiest beneficiaries, but also among beneficiaries of medium health and among unhealthy beneficiaries. In 9 of the 13 cities, the salience of routine physical exams is significantly higher for healthy enrollees than for healthy nonenrollees. In 7 of the 13 cities, minimal paperwork is significantly more salient to healthy enrollees than to healthy nonenrollees. Similar patterns occur for small bills and Skilled Nursing Facility. Other features were also significantly more salient to enrollees than to nonenrollees in scattered cities, but do not form as clearcut a pattern. Perhaps these results indicate that enrollees have considered and formed opinions about a larger number of health care features, or that healthy enrollees devote more attention to amenities or accessibility features.

TABLE 26
FEATURES THAT ARE SIGNIFICANTLY *
MORE IMPORTANT TO NONENROLLEES THAN ENROLLEES

Feature	City	HEALTH CATEGORY OF RESPONDENT		
		Healthy	Medium Health	Unhealthy
CHOICE OF DOCTOR	11	X	X	
	12	X	X	X
	13	X	X	
	14	X	X	X
	15	X	X	
	16	X	X	X
	17	X		
	18	X	X	X
	19	X	X	X
	20	X	X	
	21	X		X
	22	X	X	
	23	X	X	X
CHOICE OF HOSPITAL	11	X	X	
	12	X	X	X
	13	X	X	
	14	X	X	X
	15	X	X	X
	16	X	X	X
	17			
	18	X	X	X
	19	X	X	X
	20	X	X	
	21	X	X	X
	22	X	X	
	23	X	X	X
DRUG COVERAGE	15	X		
	20		X	
	21		X	
KNOWN/SMALL BILLS	19			X
	20		X	
SKILLED NURSING FACILITY	19			X
	20		X	
UNLIMITED HOSPITAL	16			X
CONVENIENT LOCATION	20		X	
MINIMAL PAPERWORK	20		X	

* p-value less than .05

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TABLE 27
FEATURES THAT ARE SIGNIFICANTLY *
MORE IMPORTANT TO ENROLLEES THAN NONENROLLEES

| | | | HEALTH CATEGORY OF RESPONDENT | |
| | | | Medium | |
Feature	City	Healthy	Health	Unhealthy
ROUTINE	11		X	
PHYSICAL EXAMS	12	X		
	13	X		X
	14	X	X	
	16	X	X	
	17	X		
	18	X	X	
	20	X		X
	21	X	X	
	23	X	X	X
MINIMAL	12	X		X
PAPERWORK	13			X
	14	X	X	
	15			X
	16	X		
	17	X		
	18	X		
	20	X		
	23	X		
KNOWN/SMALL BILLS	12	X		
	13			X
	14	X		
	17	X		
	18	X		
	19	X	X	
	23	X	X	
SKILLED NURSING	12	X		
FACILITY	13			X
	17	X		
	18	X		
	20	X		
	23	X	X	
UNLIMITED	12	X		
HOSPITALIZATION	13			X
	17	X	X	
	18	X		
	23	X	X	

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FEATURES THAT ARE SIGNIFICANTLY *
MORE IMPORTANT TO ENROLLEES THAN NONENROLLEES

		HEALTH CATEGORY OF RESPONDENT		
Feature	City	Healthy	Medium Health	Unhealthy
DRUG COVERAGE	12	X		
	13	X		X
	16	X		
	19	X	X	
STABILITY	12	X		
	14	X		
	17	X		
	21		X	
	23	X	X	
EASY ACCESS TO SPECIALISTS	13			X
	14	X		
	23	X		
CONVENIENT LOCATION	14	X		
	16		X	
	20	X		
PLEASANT STAFF	13			X
	14	X		

* p-value less than .05

An additional analysis was conducted of the relationship between health status and the salience of drug coverage. Executives at many HMOs had very strong opinions about including prescription drugs in the benefit package for Medicare enrollees, stating that drug coverage would subject the HMO to great financial risk by attracting very sick individuals. However, executives at several HMOs stated that drug coverage was an essential part of a good benefit package for elderly enrollees, and did not express great concern about the potential for adverse selection.

This issue was investigated by computing simple Pearson r correlations between health status and the salience of drug coverage for each enrollee and nonenrollee group. The results of these correlations are presented in Table 28. It can be seen from this Table that in 8 of the 13 cities, lower health status is significantly related to higher salience of drug coverage among nonenrollees. However, among enrollees a significant relationship between salience of drug coverage and health status was not as likely to occur: of 23 HMOs, lower health status is significantly related to higher salience of drug coverage in only 5 cases.

These results for enrollees were compared with the benefits offered by the HMOs. To see whether this relationship was different in HMOs which offered drug benefits than in HMOs which didn't offer this benefit, we looked specifically at the 9 HMOs offering drug coverage. In only 3 of these 9 HMOs was there a significant relationship between health status and the salience of drug coverage for enrollees. In the remaining 14 HMOs which did not cover prescription drugs, there was a significant relationship between health status and the salience of drug coverage in 2 HMOs and no significant relationship in 12.

The results for nonenrollees in each city were also examined, relative to the benefit packages of the study HMOs. Among the 7 cities where at least one HMO covered drugs, there was a significant relationship between nonenrollee health status and the salience of drug coverage in 5 cities. Among the 6 cities where none of the study HMOs covered drugs, there was a significant relationship between nonenrollee health status and the salience of drug coverage in 3 cities.

These results clearly do not support the hypothesis that sicker people place greater salience on drug coverage and therefore are more likely to join an HMO that offers drugs. If anything, the relationship between poor health and high salience for drug coverage is more likely to occur among nonenrollees. We, unfortunately, do not know whether these nonenrollees were able to obtain drug coverage from non-HMO health care plans.

The most striking finding about the salience of health care features is that nonenrollees rate the "choice" features, **choice of hospital** and **choice of doctor**, as being much more salient than do enrollees, regardless of health status. In general, there do not appear to be any obvious relationships between health status and the salience of any health care features. Even though there is a significant relationship between lower health status and higher salience of drug coverage among nonenrollees in 8 of the 13 cities, this relationship is not consistent among enrollee groups, nor is it consistent among enrollees in HMOs which actually cover drugs.

TABLE 28
SIMPLE PEARSON r, SALIENCE OF DRUG COVERAGE BY
HEALTH SCORE

ENROLLEES - HMO #	Pearson r	p-value	
11	-.095	.203	
12	-.064	.385	
13	-.051	.464	
14	-.005	.941	
15	-.139	.045	*
16	-.133	.049	*
22	-.156	.030	*
23	-.075	.333	
24	-.080	.262	
25	-.051	.486	
26	-.044	.757	
27	-.036	.623	
33	-.302	.001	*
34	-.166	.085	
35	-.084	.246	
36	-.294	.145	
44	.016	.817	
45	-.038	.542	
46	.232	.180	
47	-.170	.014	*
48	-.007	.926	
49	.034	.625	
50	-.048	.475	

NONENROLLEES - City #	Pearson r	p-value	
11	-.166	.055	
12	-.208	.011	*
13	-.202	.018	*
14	-.196	.023	*
15	-.072	.308	
16	-.259	.002	*
17	-.261	.002	*
18	-.275	.001	*
19	-.221	.010	*
20	-.116	.176	
21	-.089	.263	
22	-.151	.109	
23	-.211	.012	*

* p-value less than .05

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In summation, it is not apparent that the decision to join an HMO is strongly related to the salience that a beneficiary attaches to specific health care features. Many unhealthy nonenrollees attach high salience to drug coverage, yet have not chosen to join HMOs which provide drug coverage. Even among enrollees in HMOs which cover drugs, there is no consistently significant relationship between lower health status and the higher salience of drug coverage. However, the greater salience attached to the "choice" features by nonenrollees may help to explain why many beneficiaries do not join HMOs.

It is important to keep in mind that enrollees who responded to the beneficiary survey did so after joining an HMO with a TEFRA risk contract. Although the survey was timed to occur as soon as possible after the decision to join, some new enrollees still may have had up to several months to become accustomed to the features of the HMO. It is possible that enrollees' attitudes and perceptions may have undergone changes since joining, in order to mitigate "cognitive dissonance" (Festinger, 1978). This concept may be particularly applicable when examining the results of the "choice" items, in that enrollees have adapted to the restrictions on choice that exist in their new health plans.

4.4. ORGANIZATIONAL, MARKET AREA, AND MARKETING VARIABLES

Descriptive data about the study HMOs are presented below. In order to protect the confidentiality of the HMOs, these data are presented in ranges, rather than as individual values for each city or HMO. Relationships between the variables and risk selection are presented in Section 4.5.

4.4.1. MARKET-SPECIFIC FEATURES

Market-specific features are those common to all HMOs in a specific market area. Descriptive data for several of the market-specific features are presented below for the 12 market areas in the study.

HMO TEFRA Market Penetration Rate. This rate is computed as the percentage of Medicare beneficiaries in a market area who have enrolled in TEFRA risk plans. Raw data sources for this rate include HCFA's 12/31/87 UHHIMRS data tapes, and HMO-provided lists of new enrollees in the study HMOs which were used to update the UHHIMRS enrollment data. Therefore, enrollees in any HMO in the market areas prior to 12/31/87, along with new enrollees in the study HMOs during the study time periods, were counted as enrollees. Individuals who enrolled in a non-study TEFRA HMO after 12/31/87, and individuals who enrolled in a study HMO between 12/31/87 and the study time period are counted as nonenrollees in this calculation. Each market area was defined based on the counties from which the TEFRA HMOs in the study enroll Medicare beneficiaries. The TEFRA Penetration Rate data are presented below in Table 29.

TABLE 29
HMO TEFRA MARKET PENETRATION RATE

TEFRA Penetration Rate	Number of Cities
Under 5%	1
5% - 9.9%	4
10% - 19.9%	3
20% - 29.9%	2
30% or more	2
	12

Competition and Typical Medigap Premium. Blue Cross/Blue Shield supplemental or "Medigap" plans were named by each of the study HMOs as being significant competitors for Medicare beneficiaries. Information was obtained from each Blues plan on the most popular Medigap policy, along with the base monthly premium for this plan. In some market areas, actual premiums to individual beneficiaries may vary from this base, depending on beneficiary age, sex, and other underwriting factors. Medigap premium data are presented in Table 30.

TABLE 30
TYPICAL MEDIGAP PREMIUM

Base Monthly Premium Of Most Popular Medigap Policy	Number of Cities
Under $25	1
$25 - $34.99	2
$35 - $49.99	6
$50 - $74.99	2
$75 or above	1
	12

4.4.2. HMO ORGANIZATIONAL FEATURES

HMO organizational features measured included aspects of model type, size, maturity, chain membership, and profit status.

Model Type. As discussed in Section 3.1.3.1., classification of HMOs by model type is not a straightforward matter. Therefore, a variety of data were collected about model type, including model type per HCFA, service delivery model(s) used by each HMO, whether the HMO was a "pure" or "mixed" model, use of gatekeepers, number of delivery sites, number of primary care physicians, and number of hospitals. Descriptive data for several of these variables are presented below.

Model Type per HCFA's Monthly Reports. The classification of HMOs as Group, Staff, or IPA, as reported in HCFA's Monthly Reports of HMO/CMP Contracts, are presented below in Table 31.

TABLE 31
MODEL TYPE PER HCFA

Model Type PER HCFA	Number
Group	7
Staff	4
IPA	11
	22

Pure Model HMOs and "Mixed" Model HMOs. Many of the HMOs in the study used a variety of service delivery models. A variable was constructed to classify the HMOs as pure group/staff, pure IPA, or "mixed" model (which includes network-model HMOs, and HMOs which classify themselves as group, staff, or IPA but use more than one delivery model). The number of HMOs fitting each category of this variable is presented in Table 32.

TABLE 32
HMOS BY "PURE" MODEL TYPE

Pure Model Types	Number
Pure Staff or Group	6
Pure IPA	9
"Mixed"	7
	22

Use of "Gatekeepers". The Organizational Questionnaire included a question about covered referrals - did enrollees need a referral from the Primary Care physician in order to see a specialist? All but two of the HMOs in the study required referrals from the Primary Care physician in order to cover specialist visits.

Size. A number of aspects of size of the HMOs were studied. Table 33 presents the number of enrollees (of any type), and Table 34 presents the number of TEFRA enrollees.

TABLE 33
TOTAL ENROLLMENT IN STUDY HMOs

Total Enrollment	Number
Under 50,000 enrollees	3
50,000 - 99,999	4
100,000 -149,999	4
150,000-199,999	6
200,000 or more	5
	22

TABLE 34
TEFRA ENROLLMENT IN STUDY HMOs

TEFRA Enrollment	Number
Under 5,000	6
5,000 - 9,999	5
10,000 - 19,999	6
20,000 or more	5
	22
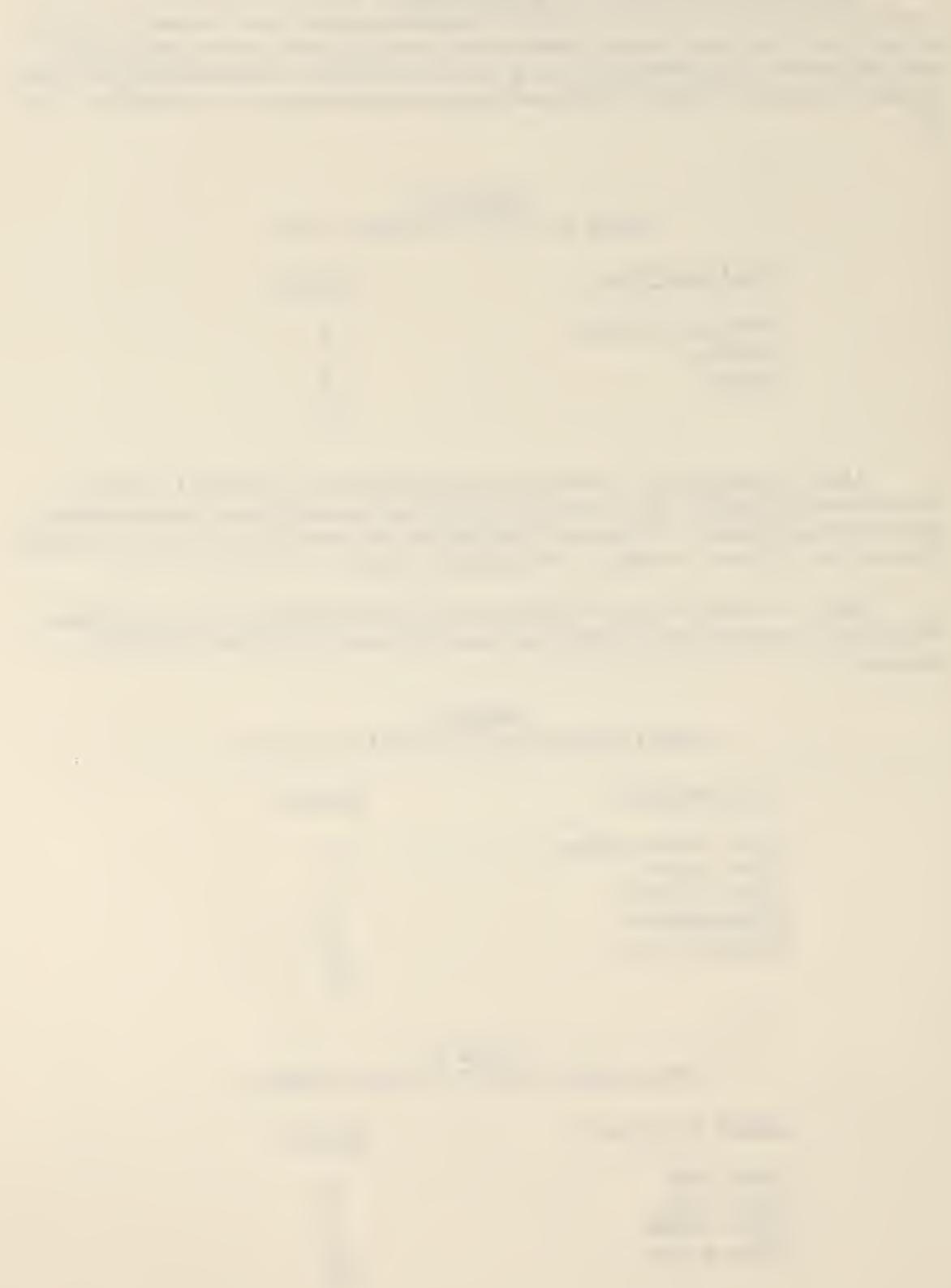
Maturity. Among aspects of "maturity" of the HMOs are the number of years the HMO had been in operation, the number of years the HMO had served Medicare beneficiaries on any basis, whether the HMO had been involved in the Medicare demonstrations, the number of years the HMO had had a TEFRA risk contract, and the total number of years that the HMO had been serving Medicare beneficiaries on a risk basis. Descriptive data for several of these variables are presented here, in Tables 35, 36, and 37.

TABLE 35
HMO YEARS IN OPERATION

HMO Years in Operation	Number
Under 5 years	6
5 years to 9 years	5
10 years or more	11
	22

TABLE 36
DEMONSTRATION PARTICIPATION OF STUDY HMOs

HMO Had Demonstration	Number
No	14
Yes	8
	22

TABLE 37
NUMBER OF YEARS OF RISK CONTRACTING OF STUDY HMOs

Number of Years Of Risk Contracting	Number
Less than 3 years	9
3 or 4 years	8
5 or more years	5
	22

Chain membership. "Chain membership" was defined as being owned by a chain or having a contractual relationship (including management contracts) with a chain. Using this definition, 16 of the HMOs in the study were part of chains, and 6 HMOs were not part of chains.

Profit status. Sixteen of the HMOs in the study were operated on a not-for-profit basis, and 6 were operated on a for-profit basis.
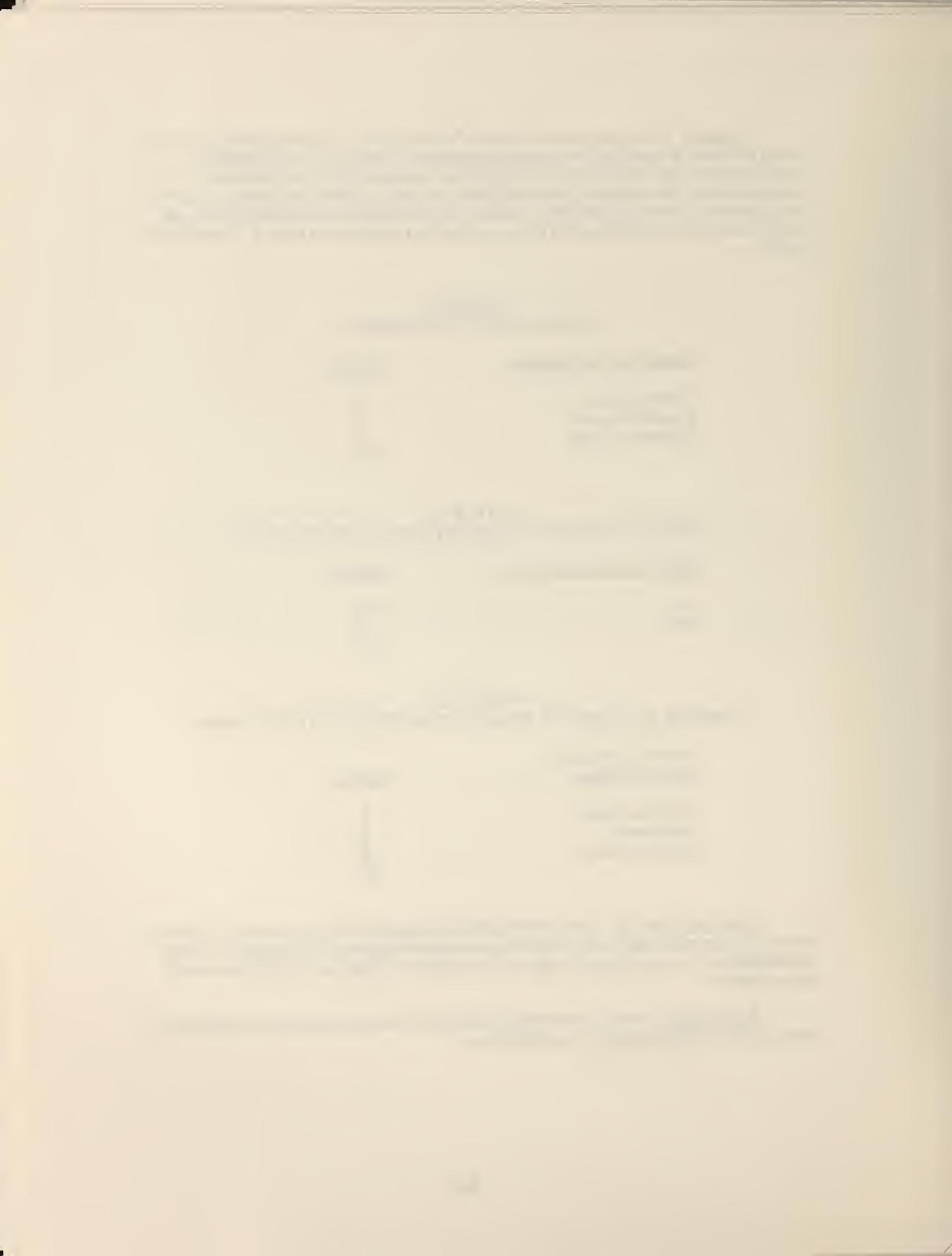
4.4.3. MARKETING VARIABLES

Product: Affiliation with Prestigious Medical Group, and Affiliation with Prestigious Hospital. A standard question asked at the site visits concerned HMO affiliation with a prestigious medical group or a prestigious hospital. Three of the HMOs in the study were affiliated with prestigious medical groups, 16 were not, and this information is unknown for 3 HMOs. Ten HMOs were affiliated with prestigious hospitals, 10 were not, and this information is unknown for 2 HMOs.

Product: Benefit Package. Benefits results are presented for 23 HMOs, because one of the HMOs in the study enrolled two different groups of beneficiaries - "regular" beneficiaries and a group with an employer-paid retiree plan. These two groups were offered different benefit plans, with different premiums.

All HMOs with TEFRA risk contracts are required to include all standard Medicare benefits in the TEFRA risk benefit packages. Therefore, benefits offered beyond the required coverage levels were examined. Beyond this required coverage level, the HMO benefit packages are quite similar in many respects. For example, all of the HMOs in the study covered hospital days in excess of those covered by Medicare. (Since the study, Medicare benefits have been expanded to remove the limitation on days of Medicare coverage.) In addition, all of the HMOs in the study covered the first-day hospital deductible ($540 in 1988).

For other types of benefits, diversity was found in the coverage offered by study HMOs. Nine of the 23 benefit packages covered some or all prescription drugs (eight required a copayment, one did not). For dental care, 19 provided no coverage, 3 provided coverage of some type, and coverage at one plan is unknown. 21 plans covered refractions, one plan did not, coverage at one plan is unknown. However, only 9 of the plans provided any level of coverage for eyeglasses. While 19 plans covered hearing care, two did not, and coverage at two plans is unknown. Only 4 plans covered hearing aids at any level. Routine foot care was covered by only 7 plans, 13 did not cover it, and coverage at 3 plans is unknown.

Table 38 presents a summary of the benefits offered by HMOs in this study.

TABLE 38
BENEFITS OFFERED BY STUDY HMOs
BEYOND MEDICARE-MANDATED BENEFITS

Benefit or Service	HMO covers this service		
	Yes (at any level)	No	Unknown
Prescription drugs	9	14	-
Dental care	3	19	1
Vision care	21	1	1
Eyeglasses	13	9	1
Hearing care	19	2	2
Hearing aids	4	18	1
Immunizations	23	-	-
Routine foot care	7	13	3
Mental Health outpatient visits	22	1	-
Physical, speech, occupational therapy	23	-	-
Skilled Nursing Facility	23	-	-
Durable Medical Equipmt.	10	3	-
Blood products	13	3	7
Hospital days in excess of Medicare	23	-	-

N = 23 HMOs

Price. HMOs provided information about the monthly premiums charged to beneficiaries. Results are presented in Table 39 for the 23 different basic benefit plans.

TABLE 39
MONTHLY PREMIUMS FOR BASIC BENEFIT PACKAGES

Basic Benefit Package Monthly Premium	Number
Under $5	4
$5 - $19	1
$20 - $29	7
$30 - $39	7
$40 and above	4
	23

Copayments charged by HMOs are also aspects of the price of HMO coverage. Among HMOs that charged copayments for various covered benefits, the dollar levels of the copayments varied to some extent, although they were usually minimal ($5 or less). The codes created for copayment variables indicated only whether or not a copayment was charged. Descriptive results presented here are for the copayments associated with 23 different benefit packages. A copayment for Primary Care office visits was required in 14 cases, and not required in 9 cases. For inpatient hospitalization, copayments were required for some or all inpatient hospitalizations in 4 cases, not required in 18 cases, and this information is unknown for 1 case.

Place: Number of Sites. As shown in Table 40, the number of delivery sites varies widely among the 22 study HMOs:

TABLE 40
NUMBER OF DELIVERY SITES

Number of Delivery Sites	Number Of HMOs
Under 10	2
10 - 19	4
20 - 49	2
50 - 99	2
100 or more	6
Number unknown	6
	22

Place: Number of Primary Care Physicians. The HMOs provided lists of the Primary Care physicians available to Medicare enrollees. Table 41 shows that there was quite a wide variation in the number of available primary care providers:

TABLE 41
NUMBER OF PRIMARY CARE PROVIDERS

Number of Primary Care Providers	Number
Under 100	7
100-199	3
200-499	7
500-999	2
1,000 or more	1
Unknown	2
	22

Place: Number of Community Hospitals. The number of community hospitals with which each HMO was affiliated (for routine care of HMO members) was a coded variable, and data are presented in Table 42.

TABLE 42
NUMBER OF AFFILIATED COMMUNITY HOSPITALS

Number of Affiliated Community Hospitals	Number
Under 5	4
5 - 9	5
10 - 19	3
20 - 39	8
40 or more	1
Unknown	1
	22

Marketing Activities: Promotion. HMOs provided information at the site visits and in the Advertising Questionnaire about promotional efforts through mass media (TV, radio, newspapers) and personal media (direct mail, community meetings, etc.). Information was also collected about the advertising budgets of the HMOs. A number of HMOs were not able to provide the data requested, due to the centralized nature of their operations, inability to capture the data elements of interest, etc.

In Table 43, information about the number and types of ads provided for the study is presented. Direct Mail was the most frequently-used medium, with all 23 HMOs providing Direct Mail materials. At the other extreme, only two HMOs provided copies of Billboard advertisements.

In addition to the media discussed above, a number of HMOs engaged in other types of promotional activities, including holding community meetings, sending marketing representatives to senior citizens' groups, sponsoring community events, etc. Of the 22

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TABLE 43
ADVERTISING MEDIA USED BY STUDY HMOS

Media	# of HMOs Using	Number of Advertisements by HMO		Total
		Minimum	Maximum	
Television	10	1	4	18
Radio	8	2	6	30
Newspaper	14	1	7	41
Direct Mail	23	2	14	147
Magazine	6	1	2	7
Billboard	2	1	1	2
Other	4	1	4	10

HMOs in the study, 15 held informational meetings of some kind, 4 did not hold any informational meetings, and the number of meetings held at 3 HMOs is unknown. Of the HMOs that held informational meetings, the number per HMO ranged from 7 meetings to 308 meetings (only 3 HMOs held more than 100 meetings).

A description of the content of the promotional materials is presented in Section 4.6., Content Analysis.

Marketing Activities: Process of Enrollment. It was originally expected that the physical process of enrolling in each study HMO would vary, and that HMOs that made enrollment more "difficult" would enroll healthier people on average. Therefore, several variables were constructed which described steps in the enrollment process. Upon assigning values to these variables, however, very little variation was found in the enrollment requirements: enrollment steps were generally the same at all the study HMOs. All but one of the study HMOs stated that enrollment applications would be mailed to interested Medicare beneficiaries. All of the HMOs stated that enrollment applications would be accepted through the mail.

It is possible that there is much less variation in the enrollment procedures than had been expected because Medicare regulations governing enrollment procedures prohibit activities that would target specific groups of potential enrollees. For example, although a number of HMOs in the study did encourage potential enrollees to attend an informational meeting, in order to allow HMO staff to explain particular HMO features such as lock-in provisions, it appeared to be the impression of HMO marketing personnel that requiring attendance would violate HCFA regulations.

4.5. RELATIONSHIP OF ORGANIZATIONAL, MARKET AREA, AND MARKETING VARIABLES TO RISK SELECTION

As discussed in Section 3.4., the original analytic plan called for analyses of the relationship between organizational, market area and marketing variables and risk selection using both Chi-square and regression models. This analytic plan was modified, due to two anticipated problems which were bigger constraints than had been expected: Chi-square tests could not be conducted due to the small number of cases, and three of the 23 HMOs had to be dropped from the analyses due to small numbers of enrollees. A strategy was devised which would limit the number of independent variables that would be tested in regression models, in order to conserve degrees of freedom. The steps of this strategy are presented below.

1) All predictor variables would be used for each different dependent variable individually. Based on these results, variables related to health status differences and those that weren't could be identified.

2) Using simple Pearson r correlations, variables that were highly correlated and that also were significantly related to health status differentials were identified and only the variable(s) that were most strongly related were retained for further analysis.

3) As a further means of reducing the number of variables to be used in regression models, several factor analyses were run to try to construct variables from sets of original variables. For example, several market area variables were factor analyzed to construct a single market area index based primarily on population size and HCFA penetration rate.

4) When any HMO organizational or market area variables strongly related to health status differentials were identified, those variables were included in subsequent models to control for the effects of this (these) variables.

5) The number of independent variables entered into the regression models was restricted so that the available degrees of freedom for error was not too limited.

Although this strategy (and the data themselves) would restrict our ability to run larger multiple regression models, it was believed that in an exploratory study such as this, the results obtained would make maximum use of available data and permit the identification of key variables. The results of each of these steps in the "regression strategy" follow in the next sections.

4.5.1. RELATIONSHIP OF SINGLE ORGANIZATIONAL, MARKET AREA, AND MARKETING VARIABLES TO RISK SELECTION

The first analyses undertaken, which were outlined as Step 1 in the Regression Analysis Strategy discussed above, related single structural and marketing variables to the

difference in mean health status between enrollees and nonenrollees, and to the Relative Low and High Health Indices. In these analyses, when a significant relationship between a particular variable and the dependent variable "difference in mean health status" was found, a similar relationship was frequently also found between the variable and one or both of the Relative Health Index dependent variables. It appears that an HMO which enrolls "healthier" individuals may be doing so through enrolling significantly more very healthy individuals, significantly fewer very sick individuals, or slightly healthier individuals throughout the whole distribution.

Our results indicate that for the 9 HMOs identified as having favorable selection at the mean of the health status distribution, favorable selection is also indicated by RLHI and, in all but one case, by RHHI. The three indicators of selection bias are quite consistent for these plans. For 10 other HMOs, favorable selection appears to exist at the tails of the health status distribution, even though tests of significance do not reveal selection bias overall. Three of these enrolled more than a proportional share of very able beneficiaries (i.e., favorable selection at the high end of the health status distribution), but in terms of overall enrollment (i.e., mean health status) were classified as having neutral selection. Interestingly, two of these HMOs also showed favorable selection in terms of the most disabled beneficiaries. Eight other HMOs, with neutral selection indicated overall (at the mean) and at the high end of the health status distribution, enrolled significantly smaller proportions of the functionally disabled Medicare beneficiaries than exist in their service area populations.

Single Organizational Variables and Market Area Variables

Results of the Weighted Least Squares regressions relating organizational and market area variables to each of the three dependent variables are presented in Table 44. As can be seen from this Table, few variables are significantly related to risk selection at the .10 level. Using the **difference in mean health status** as the dependent variable, only 4 variables are significantly related: participation in a demonstration contract, greater number of years serving Medicare beneficiaries on a risk basis, and greater length of time in the TEFRA program were significantly related to enrolling less healthy individuals, and having a higher number of HMO enrollees in the market area was significantly related to enrolling healthier individuals. With the **Relative Low Health Index** as the dependent variable, four variables were related to enrolling less healthy individuals: participation in a demonstration contract, greater number of years serving Medicare beneficiaries on a risk basis, having a higher number of changes of ownership since the beginning of 1983, and having a higher number of enrollees (in any kind of HCFA contract) in the market area. Two "model" variables were related to enrolling healthier individuals: operating as a "pure" staff/group HMO, or operating as a "pure" IPA model HMO. With the **Relative High Health Index** as the dependent variable, three variables were related to enrolling less healthy individuals: participation in a demonstration contract, greater number of years serving Medicare beneficiaries on a risk basis, and having the Primary Care physician share in the risk. Three market size variables were related to enrolling healthier individuals: having a higher number of HMO enrollees in the market area, having a higher number of Medicare beneficiaries in the market area, and having a higher market area overall population.

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TABLE 44
WLS REGRESSION RESULTS - SINGLE ORGANIZATIONAL AND MARKET AREA VARIABLES

Variable	DIFFERENCE OF MEANS			REL. LOW HLTH INDEX			REL. HIGH HLTH INDEX		
	Coeff.	p-value		Coeff.	p-value		Coeff.	p-value	
MATURITY VARIABLES:									
YrsOperation	-0.00119	.7979		-0.00236	.5422		-0.00413	.4093	
YrsAtRisk	-0.05951	.0005	*	0.02894	.0961	*	-0.04481	.0555	*
YrsMedicare	-0.00379	.6200		-0.00528	.3365		-0.01012	.2404	
YrsElderly	-0.00180	.8082		-0.00737	.1868		-0.00856	.3047	
YrsTEFRA	-0.08967	.0483	*	0.02575	.4874		-0.04185	.5335	
Demonstration	-0.24927	.0015	*	0.13344	.0656	*	-0.22423	.0393	*
Cost	-0.02887	.7609		0.00360	.9625		-0.04491	.7014	
HCPP	0.10640	.3327		-0.09760	.2237		0.09385	.5261	
HMO SIZE VARIABLES:									
TotalEnroll	-1.46 E-07	.7518		1.63 E-07	.6821		-4.83 E-08	.9301	
TEFRAEnroll	-0.000002	.4411		2.36 E-07	.9225		0.000001	.7429	
MedicareEnroll	-0.000002	.4551		1.31 E-07	.9558		5.61 E-07	.8697	
TEFRA/TotEnroll	-0.00101	.7848		-0.00076	.7859		0.00107	.8302	
TEFRA/MedEnroll	-0.00150	.5780		0.00015	.9427		0.00017	.9583	
MODEL VARIABLES:									
Profit	0.02495	.8159		0.04379	.6186		0.08571	.5366	
Chain	-0.13225	.2118		0.01988	.8157		-0.16463	.2638	
OwnerChange	-0.07196	.3001		0.13117	.0395	*	-0.01286	.8862	
PCRisk	-0.17838	.2391		0.04462	.6892		-0.42378	.0930	*
PureStaff/Group	0.10736	.3840		-0.24198	.0226	*	-0.03606	.8150	
PureIPA	0.11519	.3212		-0.20976	.0413	*	0.00769	.9586	
MARKET SIZE VARIABLES:									
MedicareMarket	2.14 E-07	.3159		-2.07 E-08	.8983		4.88 E-07	.0946	*
TEFRAEnrMarket	-0.000001	.3743		3.66 E-07	.7606		-1.22 E-07	.9489	
HCFAEnrMarket	-0.000001	.1182		0.000001	.0877	*	-3.52 E-07	.7082	
TEFRAPen	-0.00460	.1576		0.00045	.8606		-0.00646	.1594	
HMOMedPen	-0.00144	.4265		-0.00073	.6121		-0.00140	.5143	
MarketPop	3.38 E-08	.2149		-6.63 E-09	.7399		7.48 E-08	.0491	*
EnrollMarket	2.26 E-07	.0968	*	-6.34 E-08	.5375		4.22 E-07	.0304	*
MarketPen	-0.00130	.7966		-0.00039	.9275		-0.00609	.3357	

* p-value less than .10

It should be borne in mind that this is not a causal analysis, but a measurement of association. The direction of these relationships is not clear. For example, HMOs in which the physicians share in the financial risk of the TEFRA program tend to enroll fewer healthier beneficiaries, as measured by the Relative High Health Index. It is not clear whether HMOs have chosen to pass along some of the risk to the physicians because fewer very healthy beneficiaries are enrolling, or whether placing physicians at some risk is part of an overall management style which attracts fewer very healthy beneficiaries.

Single Marketing Variables

Results of the Weighted Least Squares regressions relating marketing variables to each of the three dependent variables are presented in Table 45. As shown in this Table, there were several marketing variables which were significantly related to risk selection.

Three marketing variables were significantly related to **differences in mean health status**: affiliation with a prestigious medical group was related to the enrollment of less healthy beneficiaries, whereas a higher number of TV impressions and required copayment for some or all inpatient hospital services were both related to the enrollment of healthier beneficiaries. Only two marketing variables were significantly related to the **Relative Low Health Index**: both affiliation with a prestigious medical group, and holding more community meetings, were significantly related to the enrollment of less healthy beneficiaries. Two other marketing variables were significantly related to the **Relative High Health Index**. Both a higher number of TV impressions and required copayment for some or all inpatient hospital services were related to the enrollment of healthier beneficiaries.

4.5.2. IDENTIFICATION OF "CONTROL" VARIABLE

Factor analyses of some organizational and market area variables were conducted, as discussed in Step 3 of the Regression Analysis Strategy, above. Factor analysis is a method used to describe the covariance relationships among many variables in terms of a few factors. It was conducted as a means to reduce the number of independent variables to be used in regression analyses, by creating new "factors" which can be used as independent variables. Three separate sets of independent variables were used, to create three sets of factors: maturity factors #1 and #2, HMO size factors #1 and #2, and market size or penetration rate factors #1 and #2. The factors were also "rotated" in order to strengthen the relationships of the factor loadings. The components of the factors, and their rotated loadings, are presented in Table 46.

Regression analyses were conducted, using these rotated factors as single independent variables, and using the difference in mean health score as the dependent variable. None of the rotated factors showed a significant relationship to risk selection.

TABLE 45
WLS REGRESSION RESULTS - SINGLE MARKETING VARIABLES

Variable	DIFFERENCE OF MEANS		REL. LOW HLTH INDEX		REL. HIGH HLTH INDEX	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
PRODUCT:						
PrestHosp	-0.01588	.8597	0.07398	.3082	0.05559	.5870
PrestMedGroup	-0.22001	.0645 *	0.31969	.0074 *	-0.13108	.3009
PrescrDrugs	-0.12626	.1489	-0.01556	.8320	-0.15362	.1649
PRICE:						
BasePremium	0.00284	.2744	-0.00261	.2945	0.00130	.6995
PriceCompare	0.00127	.1582	-0.00116	.1471	0.00093	.4362
CopayHosp	0.30587	.0047 *	-0.11484	.1911	0.61730	.0011 *
CopayAnyOffice	0.00084	.9943	-0.00169	.9855	-0.08513	.5405
CopayPCOffice	-0.05392	.5619	-0.04146	.5792	-0.15516	.1962
PLACE:						
NumberSites	-0.00045	.7397	0.00155	.1829	0.00108	.4863
PROMOTION:						
TotAdvert	-0.00001	.7051	0.00003	.3319	0.00002	.5651
ImpTVAll	0.000003	.0575 *	-0.000002	.1097	0.000004	.0768 *
ImpNewsAll	0.000002	.6808	0.000002	.5704	0.000003	.5658
ImpDirMail65+	-0.00014	.6660	0.00020	.4125	0.00015	.7117
CommMtgs	-0.00030	.6312	0.00093	.0892 *	-0.00023	.7729
InsideReps	-0.06843	.4666	-0.01990	.7988	0.05062	.6746
NumberDirMail	0.01858	.7071	0.02421	.5262	0.06837	.3080

* p-value less than .10

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TABLE 46
FACTOR ANALYSES

Factor: HMO Maturity

Variable	Rotated Factor #1 Weight	Rotated Factor #2 Weight
Years in operation	.90461	.05483
Years of Medicare experience prior to TEFRA	.87560	.37932
Had a cost contract	.82511	.03059
Had HCPP contract	.10727	.98855

Factor: HMO Size

Variable	Rotated Factor #1 Weight	Rotated Factor #2 Weight
Total enrollment in HMO	.26106	.84942
TEFRA enrollment in HMO	.99117	-.00761
All Medicare enrollment in HMO	.98549	.10339
TEFRA enrollment as percent of total enrollment	.68390	-.63943
TEFRA enrollment as percent of all Medicare enrollment	.11063	-.64932

Factor: Market Size

Variable	Rotated Factor #1 Weight	Rotated Factor #2 Weight
Number of Medicare beneficiaries in market area	.95878	.11470
Number of TEFRA enrollees in market area	.30173	.77946
Number of HCFA enrollees (all types of contracts) in market area	-.09872	.87597
HCFA contract penetration rate in market area	-.08892	-.73594
Total population of market area	.98410	.09680
Total HMO members in market area	.94930	.07040

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Although the factors created using maturity variables did not show a significant relationship to risk selection, WLS regressions with measures of maturity as the independent variables consistently showed a relationship with risk selection: HMOs that had more experience with Medicare beneficiaries were experiencing neutral selection. It was determined that it was appropriate to select a measure of maturity to use as the control variable in subsequent analyses, as outlined in Step 4 of the Regression Analysis Strategy. "Years at risk for Medicare beneficiaries" was chosen to be this control variable.

4.5.3. RELATIONSHIP OF ORGANIZATIONAL, MARKET AREA AND MARKETING VARIABLES TO HEALTH STATUS, CONTROLLING FOR YEARS AT RISK

Organizational and Market Area Variables, Controlling for Years at Risk

Based on the Regression Analysis Strategy, Weighted Least Squares regressions were conducted, using Years at Risk as the control variable, to test for relationships between individual organizational variables and each of the three dependent variables. This process was then repeated using "years at risk" and individual market area variables as predictors.[4] Results of these regressions are presented in Table 47. Using the difference in means as the dependent variable, both having a larger market area population and having a higher number of HMO members (of any age) in the market area are related to favorable selection. Using the **Relative Low Health Index** as the dependent variable, after controlling for years at risk, more years providing services to the elderly (in any manner, with or without a HCFA contract) was found to be related to the proportionately lower enrollment of less healthy beneficiaries. Also using the **Relative Low Health Index** as the dependent variable, a higher number of changes in ownership of the HMO was found to be significantly related to the proportionately greater enrollment of less healthy beneficiaries, while being a staff/group model was found to be significantly related to the proportionately lower enrollment of less healthy beneficiaries. The latter relationship may arise because sicker beneficiaries do not want to change providers. Using the **Relative High Health Index** as the dependent variable, controlling for years at risk, three measures of "market size" are significantly related to enrolling a greater proportion of very healthy people: being in a market area with more Medicare beneficiaries, being in a market area with a larger total population, and being in a market area with a higher number of HMO members (of any age).

[4]Estimated variances for the Relative Health Indices were observed to differ substantially across study HMOs. The assumption of equal variance for each observational unit required in ordinary least squares regression was not met. Weighted least squares regression in which the observed indices were weighted inversely proportional to their variances was used instead. Concerning the assumption of normality, as discussed previously, each index is estimated from a large number of individual observations. It is therefore assumed that each HMO index is approximately normally distributed.

TABLE 47
WLS REGRESSION RESULTS - INDIVIDUAL ORGANIZATIONAL AND MARKET
AREA VARIABLES, CONTROLLING FOR "YEARS AT RISK"

Variable	DIFFERENCE OF MEANS Coeff.	p-value	REL. LOW HLTH INDEX Coeff.	p-value	REL. HIGH HLTH INDEX Coeff.	p-value
MATURITY VARIABLES:						
YrsOperation	0.00660	.0689 *	-0.00649	.1033	0.00088	.8719
YrsMedicare	0.00317	.5846	-0.00825	.1196	-0.00563	.5100
YrsElderly	0.00505	.3415	-0.01057	.0468 *	-0.00426	.6044
YrsTEFRA	0.00417	.9275	-0.01918	.6730	0.05452	.4900
Demonstration	-0.11949	.1937	0.09445	.3380	-0.15135	.2996
Cost	0.00720	.9177	-0.02853	.7042	-0.02998	.7833
HCPP	-0.02130	.8075	-0.06305	.4377	-0.02307	.8793
HMO SIZE VARIABLES:						
TotalEnroll	4.09 E-07	.2481	-8.54 E-08	.8352	5.30 E-07	.3513
TEFRAEnroll	1.01 E-07	.9613	-0.000001	.6294	0.000003	.4038
MedicareEnroll	3.05 E-07	.8803	-0.000001	.5710	0.000002	.4690
TEFRA/TotEnroll	-0.00083	.7561	-0.00094	.7215	-0.00032	.9460
TEFRA/MedEnroll	-0.00110	.5730	0.00003	.9866	0.00020	.9484
MODEL VARIABLES:						
Profit	-0.05030	.5279	0.09109	.2901	0.03816	.7719
Chain	-0.09983	.1963	0.01673	.8368	-0.12107	.3859
OwnerChange	-0.03202	.5258	0.12690	.0330 *	0.02288	.7875
PCRisk	-0.09858	.3832	0.02986	.7795	-0.35137	.1421
PureStaff/Group	0.08163	.3546	-0.21510	.0402 *	-0.00488	.9727
PureIPA	-0.02119	.8096	-0.15158	.1579	-0.07207	.6141
MARKET SIZE VARIABLES:						
MedicareMarket	2.29 E-07	.1339	-3.61 E-08	.8145	4.67 E-07	.0832 *
TEFRAEnrMarket	8.05 E-07	.4805	-5.48 E-07	.6636	0.000001	.5817
HCFAEnrMarket	-7.14 E-07	.1803	9.12 E-07	.1772	-3.69 E-07	.6725
TEFRAPen	-0.00051	.8502	-0.00123	.6376	-0.00423	.3513
HMOMedPen	-0.00021	.8806	-0.00128	.3596	-0.00033	.8742
MarketPop	3.46 E-08	.0740 *	-8.31 E-09	.6620	6.94 E-08	.0489 *
EnrollMarket	2.45 E-07	.0086 *	-8.16 E-08	.4045	3.91 E-07	.0305 *
MarketPen	-0.00055	.8800	-0.00143	.7289	-0.00639	.2740

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* p-value less than .10

Each line in this table represents the partial results of a single regression equation.
  In each of these regressions, "years at risk" and the single variable listed were
  included as predictor variables.

Marketing Variables, Controlling for Years at Risk

Results of the Weighted Least Squares regressions relating marketing variables to each of the three dependent variables, after controlling for **years at risk**, are presented in Table 48. Using the **difference in mean health status** as the dependent variable, after controlling for years at risk, three variables are significant: a higher number of TV impressions, required copayment for some or all inpatient hospital services, and a higher price in comparison to Medigap were all related to higher mean health status. Using the **Relative Low Health Index** as the dependent variable, two marketing variables are significantly related to enrolling less healthy beneficiaries: being affiliated with a prestigious medical group, and holding more community meetings.

Using the **Relative High Health Index** as the dependent variable, two variables are significantly related to enrolling more healthier beneficiaries: a higher number of TV impressions and required copayment for some or all inpatient hospital services. One variable was significantly related to enrolling fewer healthy beneficiaries: charging a copayment for primary care office visits.

TABLE 48
WLS REGRESSION RESULTS - CONTROLLED FOR "YEARS AT RISK"
MARKETING VARIABLES

Variable	DIFFERENCE OF MEANS		REL. LOW HLTH INDEX		REL. HIGH HLTH INDEX	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
PRODUCT:						
PrestHosp	-0.00078	.9908	0.06004	.3831	0.05477	.5709
PrestMedGroup	-0.12399	.2004	0.27582	.0145 *	-0.07825	.5474
PrescrDrugs	-0.03635	.6026	-0.07187	.3361	-0.08643	.4459
PRICE:						
BasePremium	0.00266	.1540	-0.00269	.2548	0.00203	.5154
PriceCompare	0.00108	.0943 *	-0.00118	.1187	0.00101	.3617
CopayHosp	0.18868	.0278 *	-0.06602	.4829	0.55321	.0025 *
CopayAnyOffice	-0.08560	.3248	0.02603	.7720	-0.15357	.2373
CopayPCOffice	-0.10300	.1214	-0.03996	.5742	-0.24527	.0276 *
PLACE:						
NumberSites	-0.00069	.4901	0.00159	.1553	0.00071	.6217
PROMOTION:						
TotAdvert	-0.00002	.2517	0.00004	.1974	0.000006	.8461
ImpTVAll	0.000002	.0506 *	-0.000001	.1414	0.000004	.0924 *
ImpNewsAll	7.87 E-07	.8223	0.000002	.5437	0.000003	.6620
ImpDirMail65+	-0.00003	.8953	0.00011	.6226	0.00012	.7435
CommMtgs	-0.00022	.5986	0.00089	.0820 *	-0.00034	.6402
InsideReps	-0.01474	.8352	-0.02357	.7530	0.10902	.3322
NumberDirMail	0.01059	.7496	0.02556	.4761	0.05660	.3628

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* p-value less than .10

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4.6. CONTENT ANALYSIS

This section presents descriptive data about Content Analysis variables. A total of 255 advertisements were provided by the study HMOs, and were coded according to the Content Analysis Codebook (see Appendix G). The number of promotional materials provided by each of the study HMOs ranged from 4 ads (at 3 of the HMOs) to 25 ads (at 1 HMO). Ads provided by each HMO, by medium, are presented in Table 49.

Section 3.4.2. discusses the decision to conduct analyses of the relationships between risk selection and marketing using data from only 20 of the study HMOs, because three of the study HMOs enrolled very few new Medicare enrollees, and these three cases were "outlier." The advertising materials from these three HMOs were therefore not included in analyses of the relationships between content and risk selection. This resulted in a loss of only 14 of the 255 ads, and the final analysis was therefore based on 241 items from 20 HMOs.

Presentation of Services Offered by HMOs

There were a number of services or features that all HMOs were obliged to offer (e.g., no disenrollment by the HMO). There were also a number of services that it was believed that an HMO appealing to a specifically <u>healthy</u> population might choose to offer (e.g., vision care). Independent of whether or not each HMO was required to or chose to offer various services or features, HMOs could choose whether or not to mention these services in their advertising materials. Therefore, the content analysis assessed the degree to which each HMO mentioned or highlighted provisions or coverage of particular services.

Services or features chosen for the content analysis included some that were hypothesized to be relatively more important to seniors in need of immediate or continuing care, or in poorer health overall, and some that were hypothesized to be more appealing to healthier, more active seniors. Features hypothesized to appeal to "ill" seniors included easy enrollment, no pre-enrollment health screening, easy access to specialists, minimal waiting time to see a physician, home health care, drug coverage, and fully-covered hospitalization. Features predicted to be more appealing to "healthy" seniors included vision care, hearing tests, coverage of routine examinations, and a focus on health maintenance. Several additional features were also coded: statements implying multiple or relatively difficult enrollment procedures, statements indicating that all costs were fixed or known, references to the longevity or stability of the HMO or plan, and references to some degree of choice of physician and/or hospital.

The verbal content of each ad from the 20 HMOs was examined for whether (and to what extent) each of the twenty-one features of health care was mentioned. Each of the 21 variables was coded as a 0 if it was not mentioned in a particular advertisement and as a 1 if it was mentioned at least once. Table 50 presents, for each of the 21 features, the number and percentage of ads in which each of the features was mentioned.

Correlations between the mentions of the various services in each advertisement were computed and are presented in Table 51. As can be seen from the table, there is relatively little consistency in patterns of services mentioned.

TABLE 49
ADVERTISEMENTS BY STUDY HMO, BY MEDIUM

HMO #	TV	News-paper	Direct Mail	Radio	Maga-zine	Bill-board	Other	TOTAL
11	0	5	8	3	1	0	2	19
12	3	0	4	0	2	0	0	9
13	0	1	6	0	1	0	0	8
14	0	2	7	0	0	0	3	12
15	0	2	14	2	1	1	0	20
16	1	6	14	0	0	0	4	25
22	4	2	11	2	0	0	0	19
23	0	1	4	0	0	0	0	5
24	0	1	3	0	0	0	1	5
25	2	7	7	6	0	0	0	22
26	0	0	4	0	0	0	0	4
27	1	5	9	0	0	0	0	15
33	0	0	6	0	1	0	0	7
34	3	3	5	3	0	0	0	14
35	1	0	4	4	0	1	0	10
36	0	0	5	0	0	0	0	5
44	0	0	4	0	0	0	0	4
45	1	3	6	5	0	0	0	15
46	0	0	4	0	1	0	0	5
47	1	2	2	0	0	0	0	5
48	0	0	4	0	0	0	0	4
49	0	0	10	0	0	0	0	10
50	1	1	6	5	0	0	0	13

TABLE 50
PRESENTATION OF SERVICES:
NUMBER AND PERCENTAGE OF ADS IN WHICH
SPECIFIC FEATURES ARE MENTIONED

Variable	Number of Advertisements	Percent of Advertisements
Easy enrollment	27	11.2%
Difficult enrollment	1	.4%
Out-of-area service	26	10.8%
Minimal paperwork	94	39.0%
No health screening	17	7.1%
No disenrollment by HMO	11	4.6%
Convenient location	49	20.3%
Expenses fixed/known in advance	99	41.1%
Easy access - specialist	32	13.3%
Stability of plan	32	13.3%
Choose personal physician	94	39.0%
Choose hospital from list	27	11.2%
Waiting times	9	3.7%
Home health care	35	14.5%
Skilled Nursing Facility	28	11.6%
Drug coverage	30	12.4%
Health maintenance	43	17.8%
Vision care	75	31.1%
Hearing care	59	24.5%
Hospitalization in full	79	32.8%
Routine physical exams	63	26.1%

Total advertisements: N = 241

TABLE 51
CORRELATION MATRIX FOR MENTIONS OF SPECIFIC SERVICES

VARIABLE	6.EASYENRL	7.HARDENRL	8.OUTSERV	9.REHPAPER	10.NOSCREEN	11.MEDISENR	12.CONVLOC	13.NOCOST	14.SPECLIST	15.STABLE	16.DOCTOR	17.HSPCNDIC
6.EASYENRL	1.0000											
7.HARDENRL	-.0329	1.0000										
8.OUTSERV	.1753	-.0324	1.0000									
9.REHPAPER	.2394	.0807	.1222	1.0000								
10.NOSCREEN	.4672	-.0178	.3179	.2781	1.0000							
11.MEDISENR	.2378	-.0141	.2444	.1104	.3290	1.0000						
12.CONVLOC	.0494	-.0928	-.0098	-.0098	.0218	.0377	1.0000					
13.NOCOST	.1847	.0779	.3934	.4317	.2970	.1003	.0183	1.0000				
14.SPECLIST	.2978	-.0283	.3187	.2837	.3486	.2074	.1091	.0966	1.0000			
15.STABLE	.3292	-.0283	.1004	.2937	.3320	.1488	.1248	.1062	.2072	1.0000		
16.DOCTOR	.3284	.0807	.1607	.2192	.3113	.1104	.2724	.0966	.9860	.2837	1.0000	
17.HSPCNDIC	.3462	-.0329	.0037	.0696	.2104	.0484	.2128	.1046	.2096	.2497	.3293	1.0000
19.WAIT	-.0700	-.0127	-.0498	.0220	.2031	-.0431	.1180	.0690	.0918	.1908	.2014	.0588
18.HOMECARE	.2270	.0298	.4440	.1090	.1184	.1920	.1429	.3023	.0817	.2866	.1839	.0778
20.NURSING	.1696	-.0234	.3417	.0852	.2941	.2309	.0742	.3288	.1824	.1262	.1879	-.0066
21.DRUGS	.0893	.1719	.1920	.1108	.0434	-.0222	.0893	.3728	.0006	.2329	.1633	.2247
22.ALTMEDIC	.2124	-.0301	.2971	.0929	.4218	.1098	-.0469	.2277	.3967	.2329	.1192	.1427
23.VISION	.2443	.0460	.2963	.2883	.3398	.1968	.0828	.8800	.1339	.2246	.2836	.1891
24.HEARING	.2361	-.0298	.2810	.2372	.2994	.1829	.0720	.8360	.1188	.1188	.2174	.1098
25.HSPCOVID	.3764	.0824	.3686	.2633	.3948	.1861	-.0014	.4950	.1429	.2816	.2782	.2294
26.ROUTINE	.0861	.1068	.2497	.3180	.2787	.1414	.0614	.4248	.1545	.1568	.1828	-.0017

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TABLE 51, continued
CORRELATION MATRIX FOR MENTIONS OF SPECIFIC SERVICES

	18. WAIT	19. HOMECARE	20. NURSING	21. DRUGS	22. HLTHMNTC	23. VISION	24. HEARING	25. HSPCOVER	26. ROUTINE
18.WAIT	1.0000								
19.HOMECARE	-.0191	1.0000							
20.NURSING	-.0031	.9561	1.0000						
21.DRUGS	.1246	.3093	.3163	1.0000					
22.HLTHMNTC	-.0944	.3078	.2707	.0868	1.0000				
23.VISION	.1040	.4382	.4378	.3166	.2017	1.0000			
24.HEARING	.0914	.3993	.4861	.2822	.2348	.9471	1.0000		
25.HSPCOVER	.1422	.3401	.8192	.3793	.2916	.9507	.9461	1.0000	
26.ROUTINE	.1017	.3444	.4336	.1188	.1431	.9199	.9617	.4966	1.0000

Presentation of Actors/Models

It was hypothesized that advertisers make advertising content decisions based in part on the audiences they wish to reach. Therefore, if appeals were intended to reach different audiences, clues to the desired audience might be found in the types and constellations of characters used in various ads. For example, it is likely that marketing aimed at reaching a healthier population would contain models designed to appear relatively young. In addition, data indicate that overall, white seniors are healthier than non-whites (Schlenger, et al., 1983), and one would therefore predict that HMO ads designed to appeal to a healthy population would use mostly or exclusively white models.

Each ad was coded for total number of male senior models, number of female senior models, number of white seniors, and number of non-white seniors. Ads were also examined to determine whether seniors were portrayed singly or in groups, and the level of action portrayed in each ad was quantified on a continuum ranging from no action due to disability to high level of action. This resulted in a 7 (single, single-but-implied-other, single-no-other, multiple, multiple-all-support, multiple-senior-support-mix, multiple-any-medical) by 5 (disabled, restricted, static action, moderate action, high action) matrix representing a relationship between character constellations and activity levels. This is illustrated in the Content Analysis Codebook and Codesheet in Tables 2 and 3 (Appendix G). Finally, in order to examine the milieu of health care depicted, the numbers of seniors portrayed as very ill, ill, well, and healthy were tallied. (There were no cases in which seniors were portrayed as "ill" so this category was subsequently omitted.) The sex and race of the medical staffs (doctors, nurses) and support characters were coded.

Correlations between the character presentation variables are presented in Table 52. Interrelationships between these variables are consistent: in general, these relationships appear to represent a marketing strategy of providing either an abundance of images or very few images. When many images are provided, different scenes reflect a full range of HMO activities and services - thus there are even high correlations between presentations of very ill seniors and well and healthy senior images.

Presentational Style of Audio-Visual Advertisements

Several presentational variables were generated that measured the speed and amount of information presented in electronic media ads. Creators of electronic media ads have several presentational choices. They might produce a long 60-second spot that moves fairly slowly, makes two or three main points in that time, and presents relatively few visual changes. Alternately, they could fill a 30-second spot with a rapidly-paced ad, one with multiple changes in scenes and characters that presents non-redundant information in the video and audio tracks. Piagetian-based research on cognitive processing of electronic media information suggests that (1) a more rapidly-paced presentation is more difficult to understand than a moderately-paced one, and (2) the degree to which the video and audio match (or are redundant) is significantly related to comprehension of the material (Meyer, 1983). An ad in which there is no match is most difficult to comprehend, whereas one in which each complements the other will result in higher understanding. In this context, it was predicted that an ad using slow to moderate pace, in which there is audio and visual redundancy, would be easiest for seniors - especially those who are ill or have hearing or vision impairments - to comprehend.

TABLE 52
CORRELATION MATRIX FOR CHARACTER PRESENTATION VARIABLES

VARIABLE	37. MALES	38. FEMALES	39. WHITE	40. NONWHITE	68. VERYILL	69. ILL	69. HEALTHY	70. MALERED	71. FEMRED	72. MALESUP	73. FEMSUP	74. MATIRED	75. NONWTIRED	76. WHTSUP	77. NONWTSUP
37. MALES	1.0000														
38. FEMALES		1.0000													
39. WHITE			1.0000												
40. NONWHITE				1.0000											
68. VERYILL					1.0000										
69. ILL						1.0000									
69. HEALTHY							1.0000								
70. MALERED								1.0000							
71. FEMRED									1.0000						
72. MALESUP										1.0000					
73. FEMSUP											1.0000				
74. MATIRED												1.0000			
75. NONWTIRED													1.0000		
76. WHTSUP														1.0000	
77. NONWTSUP															1.0000

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Thus, it was proposed that ads designed to appeal to a healthier senior sample would be longer, more rapid generally, and more "information diverse" - there would be little redundancy between the visual and audio "tracks" in TV ads, and there would be more audio information generally in both TV and radio ads. Variables created to characterize the presentation of electronic media included ad duration, audio pace (number of words spoken), audio clutter (music or sound effects co-present with narration), visual cuts, visual scenes, changes in character constellations, audio-visual redundancy, and total time of straight narrative. Explicit definitions and coding procedures are provided in Tables 2 and 3 of the Content Analysis Codebook and Codesheet (Appendix G).

Correlations between the various electronic media variables are presented in Table 53. Longer ads were characterized by more narration, music, and sound effects. Time devoted to straight narrative - presumably in which a significant amount of information is imparted - was negatively related to rapid visual change (e.g., camera cuts or scene changes).

Presentational Style of the Print Advertisements

The newspaper, magazine, and brochure advertising materials were coded for the amount and presentation of print variables. Variables were selected that appeared to differentiate print ads that were easy to read and "information-dense" from those that were less informative and more difficult to read. Therefore, total numbers of pictures and graphics, total square inches devoted to pictures, graphics, and text, and the total square inches of the presentation were coded. The size and leading (space between lines of print) of the primary and secondary advertisement text, total numbers of sentences that contrasted to other text (e.g., were bold, italicized, and/or capitalized), the total number of long lines (i.e., greater than 4.5 inches), and the average sentence length were also coded variables.

Correlations between the print variables are presented in Table 54. Larger ads generally presented more text, and used more stylized and capitalized sentences, larger type size, more pictures and more graphics.

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TABLE 53
CORRELATION MATRIX FOR ELECTRONIC MEDIA VARIABLES

VARIABLE	78. DURATION	79. PACE	80. CLUTTER	81. CUTS	82. SCENES	83. CONSTEL	84. REDUND	85. NARRTIVE
78. DURATION	1.0000							
79. PACE	.8366	1.0000						
80. CLUTTER	.6663	.4064	1.0000					
81. CUTS	-.1065	-.5699	.2330	1.0000				
82. SCENES	-.1874	-.4012	.1235	.7575	1.0000			
83. CONSTEL	-.2049	-.1861	.2319	.3800	.8782	1.0000		
84. REDUND	.2325	-.0062	-.0086	.4424	.2848	-.1924	1.0000	
85. NARRTIVE	.5795	.9124	-.0774	-.8456	-.3192	-.0918	.0312	1.0000

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TABLE 54
CORRELATION MATRIX FOR PRINT VARIABLES

VARIABLE	86. TOTINCH	87. PICINCH	88. NUMPIX	89. GRAFINCH	90. NUMGRAF	91. TEXTSIZ1	92. TEXTLED1	93. TEXTSIZ2	94. TEXTLED2	95. TEXTAREA	96. BOLD	97. STYLIZD	98. CAPS	99. LONGLINE	100. SENTLGTH
86. TOTINCH	1.0000														
87. PICINCH	.9174	1.0000													
88. NUMPIX	.7071	.7690	1.0000												
89. GRAFINCH	.0213	-.0808	-.0227	1.0000											
90. NUMGRAF	.3196	.0296	.2617	.3471	1.0000										
91. TEXTSIZ1	.0613	.1339	.3011	-.0408	.0191	1.0000									
92. TEXTLED1	.0290	-.0188	-.1796	-.1281	-.3780	-.1891	1.0000								
93. TEXTSIZ2	.0190	.2372	.1597	-.0429	-.0407	-.0429	-.0003	1.0000							
94. TEXTLED2	.1362	.1972	.1696	-.0202	.1622	.1466	.0587	.8896	1.0000						
95. TEXTAREA	.7104	.2811	.0272	-.0496	.9693	.0021	-.3952	.1706	.3471	1.0000					
96. BOLD	.0496	.0093	.0293	-.0708	-.0007	-.1188	-.1375	.1124	.1996	1.0000					
97. STYLIZD	.2653	.0227	.3482	-.0690	.1442	.0530	-.2454	.2029	.2766	.2882	.1275	1.0000			
98. CAPS	.4072	.1186	.1871	-.0631	.4763	.8218	-.1270	.3029	.0529	.4239	.0718	1.0000			
99. LONGLINE	.3798	.0452	.0148	.3202	-.0603	-.0429	.3998	-.0010	.2182	.1128	-.1137	-.1234	.0838	1.0000	
100. SENTLGTH	.1171	.1809	.1412	.2814	-.1212	-.1382	.0718	-.1282	-.0247	-.0287	-.3940	-.1908	-.3978	.2848	1.0000

4.7. RELATIONSHIP OF CONTENT ANALYSIS VARIABLES TO HEALTH STATUS

This section presents results of statistical analyses of the relationships between content and risk selection. The nature of these analyses differs from other analyses conducted in this study. In Content Analysis, the traditional approach to examining relationships is to treat each advertisement as an independent item and to relate the contents of that ad to the outcomes (here, favorable or neutral selection) of interest. There is no weighting of ads to account for the number of ads from each subject (HMO), and there is no effort to account for any possible correlations between content features of multiple ads run by each subject. Because marketing includes not only ad content and other features, but also the practice of placing similar themes in a variety of ads, the use of averaging, weighting or any other method which would remove the independence of each ad would lose the important impact of the overall ad campaign.

Therefore, in order to examine whether the content and presentation of ads differed in relation to risk selection, advertisements were categorized as coming from HMOs with favorable selection or HMOs with neutral selection (no HMOs experienced adverse selection). The mean frequency with which each content variable occurred in ads from "favorable selection HMOs" and "neutral selection HMOs" was compared, using a t-test for differences in means. The analysis is based on 241 advertisements (each advertisement is defined as a case).

There were 106 advertisements from 8 HMOs that experienced favorable selection, and 135 advertisements from 12 HMOs that experienced neutral selection. The number of individual ads used during the 5-month collection period ranged from four to 25. The mean number of advertisements used was 12 (1 TV ad, 1.5 radio ads, 2 newspaper ads, 7 direct mail brochures, and one miscellaneous type such as magazine, billboard, or flyer).

Statements Concerning Services Offered by HMOs in their Advertisements

Separate tests for differences in mean mentions of specific items were conducted on each of the 21 service variables, for all ads from HMOs with favorable selection and all ads from HMOs with neutral selection. A variable was coded as 0 if it was not mentioned in a particular advertisement and it was coded as 1 if it was mentioned at least once. As shown in Table 55, only two variables are significantly related to risk selection at the .10 level: higher mentions of minimal paperwork are related to favorable selection ($p = .0264$), and higher mentions of convenient location are marginally related to neutral selection ($p = .0796$). The small difference in mean mentions between favorable and neutral HMOs (2.69 vs. 2.55 for minimal paperwork and 2.75 vs. 2.84 for convenient location) indicates that there is actually little difference in mentions for these items. Thus, it appears that there is little difference between the ads of HMOs that experienced favorable selection and those that experienced neutral selection, in terms of what they mention or how frequently.

Presentation of Actors/Models

Separate tests for differences in mean character presentation variables were conducted, for ads from HMOs with favorable selection and ads from HMOs with neutral

TABLE 55
PRESENTATION OF SERVICES OFFERED BY HMOs
COMPARISON OF MEAN MENTIONS

Variable	Mean for Favorable Selection	Mean for Neutral Selection	p-value of t-test	
Easy enrollment	2.8962	2.8815	.7200	
Difficult enrollment	0.0000	0.0074	.3767	
Out-of-area coverage	2.8679	2.9111	.2853	
Minimal paperwork	2.6887	2.5481	.0264	**
No health screening	0.0539	0.0754	.4561	
No disenrollment	0.0454	0.0428	.9203	
Convenient location	2.7453	2.8370	.0796	**
Known/small bills	2.6321	2.5556	.2325	
Easy access to specialist	2.8302	2.8963	.1344	
Stability	2.8774	2.8593	.6826	
Choice of doctor	2.6132	2.6074	.9274	
Choice of hospital	2.9245	2.8593	.1117	
Waiting time	2.9528	2.9704	.4780	
Home health care	2.8208	2.8815	.1856	
Skilled Nursing Facility	2.8679	2.8963	.4971	
Drug coverage	2.8868	2.8667	.6402	
Health maintenance	2.8585	2.7926	.1862	
Vision care	2.7170	2.6667	.4045	
Hearing care	2.8019	2.7185	.1363	
Full coverage of hospital care	2.6981	2.6519	.4497	
Routine physicals	2.7358	2.7407	.9320	

** significant at .10 level

selection. As can be seen in Table 56, a significant effect was obtained for total number of male seniors (p = .0290); HMOs with neutral selection presented more male senior actors (mean of .792 per ad) in their advertising than did HMOs with favorable selection (mean of .326 per ad). A significant effect was also obtained for total number of (white) seniors (p = .0748); HMOs with neutral selection presented more seniors overall (mean of 1.136 seniors per ad) in their advertising than did HMOs with favorable selection (mean of .616 seniors per ad). (Because the number of nonwhite seniors presented overall was very low, the number of white seniors is really a proxy for the number of seniors.) When looking at character constellations and activity levels, only two combinations have p-values under .10 (single-to camera-seniors/moderately active, and single-solitary-seniors/moderately active). Due to the small number of advertisements which presented these types of characters, it is difficult to interpret the findings for these character constellations and activity levels.

Neither the number of male medical characters nor the number of male support characters were significantly related to risk selection. However, the total number of male "helpers" (male medical characters plus male support characters) was significantly related (p = .0632) to risk selection: ads from HMOs that experienced favorable selection presented more male helpers (mean of .465 male helpers per ad) than did ads from HMOs that experienced neutral selection (mean of .160 male helpers per ad).

Presentational Style of Audio-Visual Advertisements

Separate tests for differences in each of the electronic media variables were conducted, for electronic ads from HMOs with favorable selection and electronic ads from HMOs with neutral selection. Results of these analyses are presented in Table 57. Audio clutter in TV and radio ads was significantly related to favorable selection (p = .0200): ads from HMOs with favorable selection had an average of 35.32 seconds of audio clutter, compared with 22.286 seconds of audio clutter in ads from HMOs with neutral selection. Number of cuts in television ads was significantly related to favorable selection (p = .0217): ads from HMOs with favorable selection had over twice as many cuts as ads from HMOs with neutral selection. The number of seconds of straight narrative in TV ads was also significantly related to favorable selection (p = .0035): HMOs with favorable selection averaged only 3.57 seconds of straight narrative per ad, while HMOs with neutral selection averaged 22.27 seconds of straight narrative per ad. No other TV and radio presentation variables were significantly related to risk selection.

Presentational Style of the Print Advertisements

Separate tests for differences in means were conducted on each of the print presentation variables, for print ads from HMOs with favorable selection and print ads from HMOs with neutral selection. As shown in Table 58, several print presentation variables were significantly related to risk selection. Print materials from HMOs with favorable selection used fewer square inches of pictures (p = .0768), fewer graphics (p = .0848), and fewer sentences printed in capital letters (p = .0395). While there were no significant relationships between type size and risk selection, HMOs with favorable selection used larger leading (the space between lines of printing) than did HMOs with neutral selection. This was true for the primary type (p = .0172) and for the secondary type (p = .0757).

TABLE 56
PRESENTATION OF CHARACTERS
COMPARISON OF MEANS

Variable	Mean for Favorable Selection	Mean for Neutral Selection	p-value of t-test	
Male seniors	.32558	.79200	.0290	**
Female seniors	.38372	.61600	.2190	
White seniors	.61628	1.1360	.0748	**
Nonwhite seniors	.06977	.02400	.1832	
Very Ill seniors	.02326	.00800	.4798	
Well seniors	.04651	.07200	.7538	
Healthy seniors	.03488	.03200	.9480	
Male medical	.20930	.08000	.1644	
Female medical	.04651	.11200	.3317	
Male support	.25581	.08000	.1261	
Female support	.15116	.16800	.8897	
Male help (medical & support)	.46512	.16000	.0632	**
Female help (medical & support)	.19767	.28000	.6337	
White medical	.23256	.17600	.6704	
Nonwhite medical	.02326	.01600	.7586	
White support	.32558	.21600	.5132	
Nonwhite support	.03488	.00800	.2542	
Single/Static	.18605	.19200	.9558	
Single/Moderate Activity	.0000	.08000	.0070	**
Single (implied other)/Static	.0000	.2000	.1128	
Single (implied other)/Moderate Activity	.0000	.0160	.2406	

PRESENTATION OF CHARACTERS
COMPARISON OF MEANS

Variable	Mean for Favorable Selection	Mean for Neutral Selection	p-value of t-test
Single (no other)/ Static	.0000	.0400	.2499
Single (no other)/ Moderate Activity	.0000	.0320	.0948 **
Mult. seniors/ Static	.20930	.32000	.4667
Mult. seniors/ Moderate Activity	.16279	.15200	.9261
Mult. seniors/ High Activity	.0000	.06400	.1745
Mult. all support/ Restricted	.0000	.00800	.4081
Mult. all support/ Static	.03488	.02400	.6421
Mult. all support/ Moderate Activity	.0000	.02400	.2659
Mult. sr. & support/ Static	.0000	.04000	.4081
Mult. sr. & support/ Moderate Activity	.0000	.01600	.4081
Mult. any medical/ Disabled, Incapacitated	.02326	.00800	.4798
Mult. any medical/ Static	.09302	.08800	.9553
Mult. any medical/ Moderate Activity	.0000	.00800	.4081

** significant at .10 level

TABLE 57
PRESENTATION OF TELEVISION AND RADIO
COMPARISON OF MEANS

Variable	Mean for Favorable Selection	Mean for Neutral Selection	p-value of t-test	
Duration	51.600	47.143	.3025	
Audio pace	122.800	116.710	.5804	
Audio clutter	35.320	22.286	.0200	**
Cuts (TV only)	11.000	4.727	.0217	**
Scenes (TV only)	3.857	3.455	.7991	
Character constellations (TV only)	1.857	1.818	.9581	
A/V redundancy (TV only)	2.714	2.636	.9412	
Straight narrative (TV only)	3.571	22.273	.0035	**

** significant at .10 level

TABLE 58
PRESENTATION OF PRINT MEDIA
COMPARISON OF MEANS

Variable	Mean for Favorable Selection	Mean for Neutral Selection	p-value of t-test	
Total square inches	495.4500	917.8500	.1043	
Picture square inches	19.0230	44.5000	.0768	**
# of pictures	0.6818	1.4773	.1037	
Graphics square inches	6.8409	12.8640	.3190	
# of graphics	0.3182	0.9318	.0848	**
Primary text size	9.2558	10.7230	.1337	
Primary text leading	3.7674	3.0213	.0172	**
Secondary text size	3.5366	3.8478	.8988	
Secondary text leading	1.2683	0.5217	.0757	**
Text area	140.7100	184.6800	.3953	
Bold sentences	21.5680	20.8090	.9122	
Italicized/sty-lized sentences	4.6818	7.7447	.2884	
All caps sentences	7.0227	18.7660	.0395	**
Long lines	14.0000	19.7660	.3149	
Average sentence length	127.4300	123.1400	.7064	
Total information index	26.8640	59.7730	.0323	**

** significant at .10 level

An index of total information was created by summing the square inches of pictures, square inches of graphics, total number of pictures, and total number of graphics. Analysis using this index showed a significant relationship to risk selection (p = .0323): HMOs which experienced favorable selection were less likely to present pictorial or graphic information than were HMOs which experienced neutral selection.

Generally, HMOs that experienced favorable selection were less likely to present information - pictorial, graphic, or textual - than were HMOs that experienced neutral selection. Upon examination of the print advertisements, two types of print materials emerged. They might be categorized as high and low information. High information materials - characteristic of those HMOs that experienced neutral selection - appeared to be more informative than the ads from favorable-selection HMOs. As expected, there was more text overall, and, contrary to expectations, more pictures and graphics materials as well.

In the next section the results of the analyses of health status, organizational, market area, marketing and content analysis variables will be integrated and discussed.

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5.0. DISCUSSION AND CONCLUSIONS

In the following section, project findings are related to the hypotheses, and implications of the findings are discussed.

5.1. SELECTION BIAS: HEALTH STATUS AND AGE

Health Status. Among the 23 HMOs in this study, using the dichotomous risk selection measure which includes an age/sex adjustment, favorable selection occurred in nine HMOs, neutral selection occurred in 14 HMOs, and adverse selection did not occur in any of the study HMOs. Despite the fact that the majority of HMO executives we talked to during site visits believed that their HMOs were experiencing adverse selection, the finding that none were, in fact, experiencing adverse selection was not unexpected. The preponderance of the literature on selection bias in Medicare HMOs has found favorable selection to be common and in a lesser number of cases Medicare HMOs have experienced neutral selection (Brown, 1988). This finding is wholly consistent with previous research.

It had also been hypothesized that risk selection would vary by HMO model type: that "Groups" (Group model HMOs and Staff model HMOs) would experience favorable selection, while IPAs would experience adverse selection. By model type (as defined by HCFA), 4 of the 11 Group or Staff HMOs experienced favorable selection, and 5 of the 12 IPA model HMOs experienced favorable selection.

The effect of model type on risk selection was tested using three different dependent variables in WLS regressions, with HMOs classified as "pure" Group or Staff, "pure" IPA, or Mixed Model. Results of the regression analyses using the **Relative Low Health Index** as the dependent variable, presented in Section 4.5., show that being a "pure" Staff or "pure" Group model HMO is significantly related to enrolling fewer very sick beneficiaries, whether or not Years at Risk is included as a control factor. Regression analyses without a control factor also showed that being a "pure" IPA is related to enrolling fewer very sick beneficiaries, but this relationship is not significant after controlling for Years at Risk. (Most likely this result shows the effect of maturity rather than model type on risk selection since many of the IPAs we studied were fairly new in the Medicare "business.") Regressions run using the **difference in mean health status** between enrollees and nonenrollees and using the **Relative High Health Index** as dependent variables did not show any significant relationships between risk selection and model type.

The consistent relationship found between being a "pure" Group or Staff model HMO and enrolling fewer very sick beneficiaries is reasonable, when considering that these HMOs are likely to have a closed panel of providers. Individuals who join these HMOs are quite likely to have to change physicians when joining the HMO, and it is probable that individuals who are very sick have already established a relationship with a physician (Eggers, 1980).

The hypothesis that IPA model HMOs would experience adverse selection was not supported by this study. The hypothesis was based on the premise that sicker individuals

would be attracted to plans which offered expanded benefits and a broad choice of providers. After controlling for Years at Risk, there were no significant relationships between being a "pure" IPA and risk selection, regardless of the measure of risk selection used.

The only other study to date of risk selection experience in TEFRA HMOs was reported by Brown (1988). Using prior Medicare reimbursements as the measure of risk selection, Brown found that, of 17 HMOs participating in the Medicare Competition Demonstrations that were studied, one experienced adverse selection (significantly higher prior reimbursements for enrollees), three experienced neutral selection, and 13 experienced favorable selection (enrollees had significantly lower prior reimbursements than nonenrollees). The ratio of enrollee to nonenrollee prior reimbursements was lowest for Staff and Group model HMOs (indicating the most favorable selection), and highest for IPAs and Mixed model HMOs (indicating favorable selection, but not as extremely favorable as experienced by Staff and Group model HMOs). However, results of tests of significance of model type were not included in this report.

Age. It was hypothesized that enrollees in "Groups" (Group and Staff model HMOs) would be younger than nonenrollees, while enrollees in IPAs would be older than nonenrollees. As reported in Section 4.1., enrollees were found to be significantly younger than nonenrollees in 14 HMOs (in 8 of the 11 Staff or Group HMOs, and in 6 of the 12 IPA model HMOs, using HCFA model designations), and not significantly different in age from nonenrollees in 9 HMOs. Enrollees were not found to be significantly younger than nonenrollees in any of the HMOs. Kasper and McCombs (1985) and Brown (1988) have also reported that enrollees in the Medicare Competition Demonstrations are younger than nonenrollees.

The finding that enrollees tend to be younger than nonenrollees is reasonable when considering that individuals who are turning age 65 receive information about the Medicare program, and often must make decisions about their health insurance coverage at this time. These individuals may perceive that they are "in the market" for health insurance, and may attend more to information about Medicare HMOs. Older individuals, who have been in the Medicare program long enough to have become accustomed to their coverage, whether it is Medicare alone or Medicare plus some other insurance, may not attend to information about Medicare HMOs, and would therefore be much less likely to join. Thus, in our sample of nonenrollees, 88% were over age 66, while only 73% of enrollees were over age 66.

5.2. ORGANIZATIONAL AND MARKET AREA FEATURES RELATED TO RISK SELECTION

Maturity in the Medicare Market. It was hypothesized that more mature "Medicare" HMOs, as a result of their greater experience and sophistication with the elderly population, would experience favorable selection. This hypothesis was tested using several different measures of HMO maturity in the Medicare market. Contrary to our hypothesis, it was found that regardless of the measure of maturity or of risk selection used

(difference in mean health status, Relative Low Health Index, or Relative High Health Index), there is a significant relationship between being in the Medicare market a longer time and experiencing **neutral** (as opposed to favorable) selection. As described in Section 4.5., among the measures of maturity in the Medicare market utilized were: participation in a Demonstration contract, the number of years the HMO has served Medicare beneficiaries on a risk basis (Years at Risk), and the number of years the HMO has had a TEFRA risk contract. Due to the consistency of the relationship, **maturity** in the Medicare market, as measured by **years at risk**, was chosen as a control variable to use in further regression analyses.

There is no clear explanation of the relationship between greater HMO experience in the Medicare market and the presence of neutral selection. The organizational "missions" of HMOs that have been serving Medicare beneficiaries longer may differ from the missions of relatively newer entrants into the market, for example by placing specific emphases on serving all parts of society, including the elderly. Although we attempted to measure such differences in mission, the measures of "mission" that were created for this study apparently were not sensitive enough to detect any such differences.

An alternative explanation of this relationship may be that HMOs that have been serving Medicare beneficiaries longer may be more appealing to the elderly community - especially the less healthy members of that community. HMOs with more experience serving the elderly may provide services and a style of service that is adapted to use by the elderly, and this may become known in the community through "word of mouth" promotion by satisfied current enrollees. Thus, less healthy individuals may be more inclined to join these HMOs than they are to join HMOs which have only recently begun serving the elderly population on a regular basis.

Penetration Rates. It was hypothesized that HMOs located in market areas with higher penetration rates among Medicare beneficiaries would be less likely to experience favorable selection. If HMOs are able to "skim" the healthy beneficiaries out of the pool of potential enrollees, a market with a high penetration rate might contain proportionately fewer healthy potential enrollees, especially among those over 65 or 66. Regression analyses were conducted on each of the three measures of risk selection as dependent variables, with the penetration rate of HMOs among Medicare beneficiaries in the market area as the independent variable. No significant relationships were found.

However, other market area variables measuring various dimensions of the population in the service area did show significant relationships to risk selection. Using the Relative High Health Index as the measure of risk selection, three measures of "size of the market" were significantly related to enrolling more very healthy beneficiaries in the HMO, both before and after controlling for Years at Risk. These three market size variables are: a greater number of Medicare beneficiaries in the market area, a larger total population of the market area (all ages), and a larger absolute number of enrollees in all HMOs in the market area (all ages). The last of these three variables was also significantly related to favorable selection as measured by the difference in mean health status between enrollees and nonenrollees (both before and after controlling for Years at Risk).

Apparently, areas with larger populations, especially those that have attracted a higher absolute number of HMO enrollees (but not necessarily a higher percentage of enrollees per population) still contain a large number of very healthy seniors who are

willing to join HMOs. Thus, these areas may not yet have reached the "saturation point" with respect to the enrollment of most healthy seniors in the area that was the basis for our hypothesis relating high penetration rate to the enrollment of sicker seniors at the margin. Also, since our penetration rate measured the percentage of those already 65 and over enrolled in HMOs, this measure and our hypothesis did not accomodate the large percentage of new enrollees who were just reaching 65 years of age.

HMO Size. Relationships between risk selection and HMO size were explored. HMO size was measured in a variety of ways (total enrollment in the HMO, number of TEFRA enrollees, number of enrollees in any type of HCFA contract, TEFRA enrollment as a percent of all enrollment, and TEFRA enrollment as a percent of HCFA enrollment). Regardless of the measure of risk selection used, no significant relationships between HMO size and risk selection were found.

Model Type. The relationship between model type, measured as "pure" Group or Staff, "pure" IPA, or Mixed Model HMO, and risk selection was discussed in Section 5.1. above. In brief, closed panel HMOs ("pure" Group or Staff) experienced favorable selection, using the Relative Low Health Index as the measure of selection. Model type was not significantly related to risk selection when the difference in mean health status or the Relative High Health Index were used as dependent variables in regression models. Very sick individuals (health status scores of 0-4 on the 9-point scale) are, thus, not likely to enroll in Group/Staff model HMOs, whereas those with health status scores of 5 and 6 (moderate health) are not unlikely to join. Hence, the significant finding for Relative Low Health Index, but the non-significant finding for mean health status and the Relative High Health Index.

In addition to measuring the delivery model, several other aspects of "model type," such as profit status and chain affiliation of the HMO, were examined and the relationship of the attributes to risk selection was tested. No significant relationships were found between the risk selection measures and profit status or chain affiliation of study HMOs. Placing Primary Care physicians at risk, another dimension of HMO structure we measured, was also not found to be related to risk selection.

A finding which was neither predicted nor clearly understandable emerged from our exploratory analysis: those HMOs that had more changes in ownership since 1983 were significantly more likely to enroll more very sick beneficiaries than those that had fewer changes in ownership. This finding held both before and after controlling for Years at Risk. It is tempting to try to interpret this finding in a causal context, i.e., how do changes in ownership lead to selecting a higher proportion of very sick enrollees? However, it should be kept in mind that this is not a causal analysis, but a measurement of association in which the direction of the relationship is not clear. Perhaps HMOs that have the qualities that appeal to sicker individuals have been less stable financially in the past and have therefore had more ownership changes. During our study those qualities that appeal to sicker individuals still existed, so a higher number of very sick people still enrolled. It also should be borne in mind that this significant result may be purely due to chance.

5.3. MARKETING: "THE 5 Ps"

Product. Examination of the benefit packages offered by the study HMOs (see Section 4.4.3.) showed that there was little variation in most covered benefits. In addition, preliminary testing of the "salience" items to be included in the beneficiary survey instrument showed that few product-oriented features of health plans were highly salient to beneficiaries. The product-oriented features which were highly salient were coverage of Skilled Nursing Facility care, drug coverage, unlimited hospital coverage, and coverage of routine physicals. Of these four features, the benefit packages of the study HMOs varied only on drug coverage.

It was hypothesized that drug coverage would attract sicker beneficiaries and therefore lead to adverse selection. Indeed, in discussions with HMO administrators during the site visits, concern was expressed by many of the administrators that offering drug coverage would lead to adverse selection. Since coverage of drugs was highly salient to beneficiaries, and there was variation in coverage of drugs, the relationship between drug coverage and risk selection was analysed. No significant relationship between provision of drug coverage and risk selection experience was found.

Further analysis of the relationship between beneficiary health status and the salience of drug coverage showed that, among nonenrollees, in 8 of 13 cities there was a statistically significant relationship between poorer health and the higher salience of drug coverage. However, this relationship occurred among enrollees in only 5 of the 23 HMOs, and in only 3 of the 9 HMOs which covered drugs. Thus, it does not seem that HMO enrollees who are sicker place a higher value on drug coverage. This may explain why, despite the generally-held notion that providing drug coverage leads to adverse selection, we found no relationship between drug coverage and risk selection.

It was hypothesized that HMOs that were affiliated with prestigious medical groups or prestigious hospitals would be more likely to experience adverse selection. The assumption here was that seniors who had existing health problems or who had a high level of concern about their health would be more likely to join a plan whose delivery system included providers with a reputation for delivering excellent quality care. Analyses of the relationship between affiliation with a prestigious medical group and risk selection showed that, after controlling for Years at Risk, affiliation with a prestigious medical group was significantly related to enrolling more very sick beneficiaries, as measured by the Relative Low Health Index. However, no significant relationships were found between affiliation with prestigious hospitals and risk selection. In distinguishing between the results found for prestigious medical groups and those found for hospitals, it is possible that additional factors, such as the location of the hospital, whether a beneficiary has used the hospital in the past, etc., are more important to beneficiaries than prestige in evaluating the hospitals available through HMOs. Alternatively, it may be that potential enrollees place greater faith in the professionals who will attend them in the hospital and believe that "good doctors" can provide good quality care even in non-prestigious hospitals.

Price. Analyses were conducted using several different measures of price. There were no significant relationships between the absolute level of monthly premiums and risk selection. However, charging a higher relative monthly premium (in relationship to the

most popular Medigap policy in the market area) was related to favorable selection, as measured by the difference in mean health status, after controlling for Years at Risk. It had been hypothesized that HMOs that charge a higher price would experience adverse selection (the "risk-vulnerability hypothesis - Berki and Ashcraft, 1980). The finding thus runs counter to previous work conducted with the under-65 population (Berki and Ashcraft, 1980; Schuttinga, Falik and Steinwald, 1985). In contrast to these studies of the under-65 population, Medicare beneficiaries are not necessarily choosing to change health insurance plans, but instead may be choosing whether or not to add to the basic Medicare coverage they already have. Here, affordability and degree of coverage may be the critical factors and sicker individuals may not be able to afford relatively more expensive plans.

Several measures of required copayments were included in the analyses. Requiring a copayment for some or all inpatient hospitalizations was significantly related to favorable selection, whether measured as the difference in mean health status or measured by the Relative High Health Index, after controlling for Years at Risk. The relationship between enrolling individuals with a higher mean health status and requiring inpatient copayments is straightforward: charging a copayment for a service that sicker individuals are more likely to use will discourage them from joining. However, there is no significant relationship between this variable and the Relative Low Health Index. While it is reasonable to assume that the very healthy (measured by the Relative High Health Index) would not be dissuaded from joining an HMO which required copayments for hospitals, it is perplexing to explain why this feature would lead to more very healthy people joining. Perhaps this finding can be understood somewhat better if the nature of the Relative High Health Index (RHHI) is recalled. The RHHI measures the proportion of those with health scores of 7 or 8 on the 9-point health status scale (the very healthy) who are in the HMO and contrasts this with the same proportion in the community. Although the most obvious interpretation of this finding is that HMOs with hospital copays attract more very healthy people than HMOs that don't require such copays, this is not necessarily the case. An alternative explanation is that fewer people in moderate health (health scores 5 and 6) as well as very few sick people (health scores 0-4) join such HMOs. This would make a "normal" proportion of very healthy people in HMOs with hospital copays appear disproportionately high. Thus, the explanation of this result could be that fewer moderately sick people and very few very sick people join HMOs with hospital copays while the same number of healthy people tend to join them.

After including Years at Risk as the control variable, requiring a copayment for Primary Care office visits was also related to favorable selection, as measured by the Relative High Health Index. This relationship is similar to that found for hospital copayments and probably results from fewer moderately sick people (as well as very few very sick people) enrolling in these plans.

Place. It was hypothesized that HMOs with more locations or more convenient locations would be likely to experience adverse selection. However, no significant relationship was found between the Number of Delivery Sites and the risk selection experience of the study HMOs. Number of delivery sites is a measure that may be confounded with other variables such as model type, which were also not consistently related to risk selection. In addition, it is not surprising that there is no significant relationship between number of delivery sites and risk selection, given that the feature "convenient location" received the lowest salience rating of any of the features presented in the beneficiary survey instrument. Beneficiaries apparently do not make their enrollment decisions based on this factor.

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Promotion. It was hypothesized that HMOs that devoted more resources to promotional efforts would experience favorable selection. Despite persistent efforts to obtain data about HMO expenditures for promotion, we were not able to collect detailed data due to the fact that 1) the HMOs frequently didn't break out expenditures for specific promotional efforts from their general marketing budget, and 2) the Medicare budget for advertising was frequently incorporated in the HMO's overall advertising budget. Thus, we were able to create only one measure of promotional expenditures: the total advertising budget of the HMO. Given the self-reported nature of the budget data, and the possibility that the HMOs may use different accounting conventions, the overall advertising budget variable may not be a good measure of resources devoted to promotional efforts. Regardless of the measure of risk selection used, no significant relationships between the advertising budget and risk selection were found.

It was hypothesized that HMOs that relied heavily on mass media (TV and radio) would attract a cross-section of the Medicare population, and thus experience neutral selection, while HMOs that relied primarily on more focused marketing such as direct mail, meetings with senior groups, etc. would be able to "target" healthy beneficiaries and thus experience favorable selection. Neither of these hypotheses was confirmed.

Analyses of the use of mass media were conducted with measures of the number of mass media impressions. A higher number of TV impressions was significantly related to favorable selection, measured by the difference in mean health status and the Relative High Health Index. There are several possible explanations for these results. One characteristic of print ads, as opposed to broadcast media, is that the reader may devote as much time as he or she desires to digest the information presented. A further explanation for these results may be found in the Content Analyses, which showed that quickly-paced ads and ads which do not present much information are related to favorable selection. Most TV ads we examined from the HMOs with favorable selection fit these characteristics. No relationship was found between risk selection and the use of newspaper advertisements.

Analyses of the use of more focused marketing were conducted using a variety of measures. No significant relationship was found between the number of Direct Mail impressions and any measure of risk selection. This is an interesting finding since the mailing lists used by most HMOs represented virtually the only explicit instance of a possible attempt at "skimming" we encountered in the study. When asked where their mailing lists came from, most HMO marketing officials indicated that their origin was the list of persons with active drivers licenses in the state. This is clearly a source that could eliminate many of the frail, disabled or chronically ill elderly. When questioned further about the use of such a biased list, most HMO officials explained that these were the only lists containing seniors' names and addresses that are available. We also found, in a few HMOs, that direct mail was being targeted to 64, 65 and 66 year olds living in specific (more affluent) neighborhoods - which might represent another type of skimming. (HMO officials contend that these are the Medicare beneficiaries that their research shows are most likely to join.) Even though the HMOs may have attempted to focus the Direct Mail efforts toward particular individuals, there is no evidence that selection was favorably biased by these actions.

Another measure of the use of more personal marketing was the number of community meetings held by HMOs. Holding a higher number of community meetings was significantly related to enrolling more very sick beneficiaries, as measured by the

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Relative Low Health Index. While this finding runs counter to the original hypothesis, it is consistent with results of the Content Analysis. It is reasonable to expect that individuals who attend community meetings are able to obtain more detailed information about an HMO. Results of the Content Analysis of promotional materials found that those which contained more information tended to come from HMOs which experienced neutral, as opposed to favorable, selection.

Two other measures of personal promotion that were investigated were the use of inside (telemarketing) representatives and the number of direct mail pieces sent to each individual on the mailing list. Neither of these variables was significantly related to risk selection.

Content Analysis. It was hypothesized that the content of advertisements used by an HMO would be related to risk selection. Using promotional materials that stress certain features, such as ease of access to the HMO, ease of enrollment, and provision of additional benefits such as prescription drugs and affiliation with prestigious doctors and hospitals, was hypothesized to appeal to sick beneficiaries and to lead to adverse selection. Conversely, stressing features such as restrictions on available providers and provision of additional benefits such as health education and preventive care, was hypothesized to appeal to healthy beneficiaries and to lead to favorable selection. In the content analysis, the number of times various themes were mentioned in an advertisement was examined to determine whether or not the HMO running the ad experienced favorable selection. T-tests for differences in mean number of mentions for 21 different health services features were conducted. There was a statistically significant difference in the number of mentions between favorable selection and neutral selection HMOs on only two features that were investigated. However, because the actual difference in mean mentions was very small, there appears to be little meaningful difference between the advertising themes regarding product attributes stressed by HMOs that experienced favorable selection and those that experienced neutral selection.

It was also hypothesized that aspects of the characters presented in advertisements would appeal differentially to sick or healthy seniors. Ads from HMOs with favorable selection presented significantly more male seniors, significantly more (white) seniors, and significantly more male "helpers" than did ads from HMOs with neutral selection. Hypotheses about the scenario of the ads (out-of-doors ads appealing to the healthy, indoor ads appealing to the sick), presentation of support networks (larger support networks appealing to the healthy), and level of physical activity shown (strenuous activity appealing to the healthy) were not supported by the data.

It was hypothesized that the "pace" of advertisements and the extent of redundant information presented in advertisements would be related to the risk selection experience of an HMO, with slowly-paced or redundant ads being easier for sicker beneficiaries to follow and understand. These hypotheses have been confirmed: more "audio clutter" (speech and music or other sound effects presented at the same time) and a higher number of "cuts" were both found to be related to favorable selection, while more seconds of straight narrative is related to obtaining neutral selection.

Lastly, it was hypothesized that presentation of greater amounts of information in advertisements would lead to adverse selection. Even though no HMOs in this study experienced adverse selection, this hypothesis can be evaluated in light of the favorable or

neutral selection experienced. Print advertisements from HMOs which experienced neutral selection contained more graphics, more square inches of pictures, more sentences printed in capital letters, and in general, more information than print ads from HMOs which experienced favorable selection.

These findings about the content of advertisements, while not supporting all of the original hypotheses, are consistent with each other. Ads from HMOs which experienced favorable selection presented much less information overall, and in a potentially more confusing format than ads from HMOs which experienced neutral selection. A possible explanation for this relationship could be that the higher the risk in choosing health insurance (and there is a higher risk for an unhealthy person), the more information is required before a decision can be made. Therefore, HMOs that present very little information, overall, are more likely to experience favorable selection since sicker persons are less likely to risk joining.

Process of Enrollment. It was hypothesized that the more "difficult" an HMO's enrollment process is for a sick person to negotiate, the more likely it would be that the HMO would experience favorable selection. Conversely, the "easier" an HMO's enrollment process is for a sick person to negotiate, the more likely it would be that the HMO would experience adverse selection. However, very little variation in enrollment requirements was found, perhaps due to HCFA regulations or state regulations concerning HMO marketing activities.

5.4. SALIENCE OF FEATURES OF HEALTH CARE

Implicit in the hypotheses about relationships between risk selection and the HMO benefit package and advertising content is a set of hypotheses about the importance of various features of health care to healthy and unhealthy beneficiaries. It was hypothesized that benefits such as preventive care, hearing and eye exams and provision of health education would be attractive to healthy people, along with features of the delivery system such as restrictions on providers. Conversely, offering benefits such as prescription drugs and long term care would be attractive to unhealthy people, along with features such as a large number of locations and easy enrollment procedures. After assigning beneficiaries to one of three health categories (healthy, medium health, unhealthy), it was found that regardless of health, nonenrollees rated the choice of doctor and choice of hospital as significantly more important than did enrollees. A variety of features were significantly more salient to enrollees than to nonenrollees in scattered cities, but these do not form a clearcut pattern of responses. It is possible that individuals who joined HMOs are influenced by a wider variety of attributes than individuals who did not join HMOs, and that this holds regardless of health status.

Examination of the frequency and proportion of all beneficiaries' ratings of health care features showed that the feature most often rated as Absolutely Necessary by beneficiaries, enrolled and not enrolled, was the **stability of the health insurance** plan, and the feature least frequently rated as Absolutely Necessary was convenient location. The most obvious difference between enrollees' and nonenrollees' responses was that 50% of the nonenrollees rated **choice of doctor** and **choice of hospital** as being Absolutely Necessary, while only 25% of the enrollees overall rated these two choice features as being absolutely necessary. Thus, it appears that the difference in beneficiaries' salience ratings is not related very strongly to health status, but instead to some differences in philosophy about the importance of being able to choose health care providers without restrictions. It is also possible that enrollees' attitudes about choice features have undergone changes since they joined HMOs, in order to lessen the degree of cognitive dissonance experienced.

5.5. CONCLUSIONS

In evaluating the findings of this study, the issue of self-selection versus HMO-induced selection is important. While 9 of the 23 HMOs experienced favorable selection (using the dichotomous risk selection measure), few clear patterns of HMO promotional efforts could be found which would account for this result. However, an examination of the beneficiaries' responses to the Salience questions shows that there are differences between individuals who join HMOs and those who do not, particularly in regard to the importance they assign to the ability to choose providers without restrictions.

On the site visits to the study HMOs, the site visit teams rarely were able to detect any efforts by the HMOs to "skim" the healthy beneficiaries in the community (except when discussing mailing lists, as was described previously). Perhaps the HMO staffs were not candid with the site visitors when discussing their intentions in promoting the TEFRA risk plans, and if so, this may be a flaw in the data collection methodology. Yet, even if it were the intention of any of the study HMOs to skim, we found no evidence that HMOs were successfully doing so: HMOs were not engaging in patterns of marketing activities which, according to our hypotheses and our results, could be expected to attract only healthy beneficiaries. The promotional efforts of the HMOs did not focus exclusively on those in good health or on features that might attract only healthy individuals. While some of the HMOs did conduct promotional activities in situations where most individuals in the "audience" would be relatively healthy, such as handing out brochures at the community's Senior Olympics, promotional activities of these HMOs also included other efforts such as community meetings, mass media advertising, etc.

Two of the factors which were found to be strongly related to favorable selection or neutral selection were the number of years the HMO had been involved in Medicare risk contracting (more Years at Risk was associated with neutral selection) and the HMO model type ("pure" group or staff model HMOs enrolled proportionately fewer very sick beneficiaries). Neither of these factors is easily subject to manipulation by HMOs. HMOs that are already in Medicare risk contracting cannot change their past experience. And while it is possible for an HMO to change the model under which it deliver services, there are many factors (such as competition in the market, the relationships already built up between current enrollees and current providers, etc.) which make this very difficult and unlikely.

More deliberate attempts at skimming could be attributed to HMOs which heavily used TV and radio advertising and which structured their ads in line with our findings about favorable selection: i.e., they put little information in the ads and used technical aspects that made the ads less possible to comprehend. However, we doubt that any of the HMOs or their advertising agencies engaged in the type of detailed analysis of these ads that we did. More likely, these ads were the result of artistic decisions made by advertising agencies and producers who probably paid little attention to the issue of selection bias when they designed the ads.

When examining the differences between beneficiaries who have enrolled in HMOs and those who have not, the issue of choice of providers appears to be very important. Regardless of health status, many beneficiaries attach a high importance to being able to go to any physician they choose and to being able to go to any hospital they choose. These beneficiaries may not be very likely to move voluntarily to a health care delivery system which restricts these choices, such as an HMO.

The limitations of the data in this study should be recalled. A constraint on the ability to find significant relationships is the limited number of HMO in the study. Given the small sample size and the resulting statistical limitations, it is possible that certain aspects of marketing indeed influence the risk selection experience of the HMOs, but that these relationships could not be detected. Likewise, multivariate analyses, which might have been able to sort out the effects of, for example, the content and media focus of advertising campaigns versus the effects of HMO maturity or model type, were not feasible given our small number of HMO cases.

An additional limitation is the non-random nature of our sample of HMOs. Technically, these results do not generalize to all HMOs with TEFRA contracts in the U.S., but rather hold only for those HMOs and those cities that we studied. However, given that we studied a high percentage of all TEFRA HMOs that were actively marketing at the time, it seems likely that these relationships would hold for other HMOs as well. One way in which our sample may not be representative is that most of the HMOs in this study voluntarily cooperated with our data collection efforts, and it is possible that these HMOs are a select group that is different from other HMOs. Because of the concern that the marketing activities and risk selection experience of HMOs that volunteered to be studied might differ from the marketing activities and risk selection experience of other (non-cooperating) HMOs, we also studied two HMOs that had refused to cooperate with our study. Based on the dichotomous risk selection measure, both of these HMOs experienced neutral selection rather than favorable selection, which might have been expected if their refusal was based on their deliberate efforts to skim, etc. While this finding provides some evidence that non-cooperating HMOs may be similar to HMOs willing to participate, it is possible that non-study HMOs may differ in the nature and intent of their marketing activities.

In considering the external validity of our findings, it is also important to recognize that we studied only HMOs that were actively (to one degree or another) marketing their TEFRA programs and enrolling new members. HMOs included in the study may have been promoting their programs because they were not experiencing adverse selection, and it is possible that HMOs that had previously dropped their TEFRA contracts or let their programs become dormant may have had very different experiences.

One reason for undertaking this study was to provide HCFA with information concerning the need for specific regulations for controlling marketing practices of TEFRA HMOs. While our findings confirm previous evidence that Medicare HMOs are experiencing neutral or favorable selection, they also suggest that the observed selection patterns are not the result of deliberate marketing actions of the HMOs. On the contrary, it appears more likely that observed patterns tend to reflect patient self-selection. Reviewing the findings of this study, we conclude that major changes to existing regulations governing HMO marketing practices are not justified, and that additional regulations in this area are unlikely to reduce the favorable selection experienced by some TEFRA HMOs.
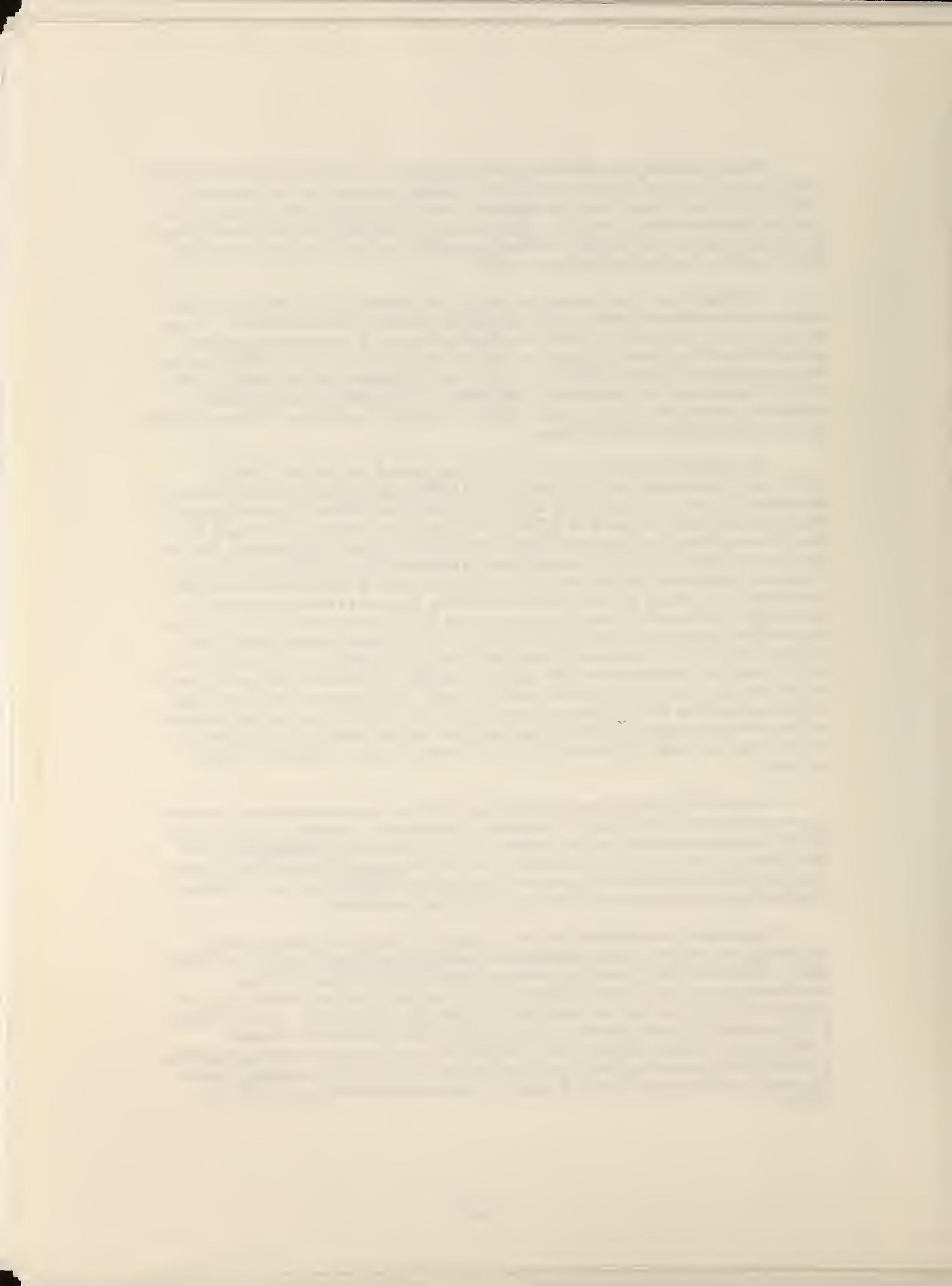
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